EPA/ROD/R05-99/518
1999

EPA Superfund
Record of Decision:

US NAVY AVIONICS CENTER
EPA ID: IN4170023499
OU 00
INDIANAPOLIS, IN
06/30/1999

Decision Document

for

AOC 1 - Former Plating Area, Building 1000

Naval Air Warfare Center

Indianapolis, Indiana

Southern Division
Naval Facilities Engineering Command

Contract Number N62467-94-D-0888

Contract Task Order 0012

May 1999

TETRA TECH NUS, INC.
661 Andersen Drive ▪ Pittsburgh, Pennsylvania 15220-2745
(412) 921-7090 ▪ FAX (412) 921-4040 ▪ www.tetratech.com

PITT 07-9-014

July 2, 1999

Project Number 7173

Department of the Navy
SOUTHNAVFACENGCOM
ATTN: Carl Loop (Code 1871)
2155 Eagle Drive
North Charleston, South Carolina 29406

Reference: CLEAN Contract Number N62467-94-D-0888
Contract Task Order 0012

Subject: Decision Documents for Parcel 1
Naval Air Warfare Center Indianapolis

Dear Mr. Loop:

Please find enclosed Decision Documents for remaining Parcel 1 AOCs. These DDs have been updated based on comments to the AOC1 DD, and are in the same agreed format.

We will touch base with the BCT regarding logistics for the signature pages.

If you have any questions, feel free to call me at (412) 921-8216.

Sincerely,

Mark Sladic, P.E.
Task Order Manager

MS/kf

Enclosures

cc: Sean Grady, IDEM (w/enclosure)
Denise Boone, USEPA (w/enclosure)
Alan Shoultz (w/o enclosures)
Mark Perry, TtNUS (w/enclosure)
Debra Wroblewski, TtNUS (w/o enclosures)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

SRF-5J

June 3,1999

Carl Loop
Department of the Navy
SOUTHDIV NAVFACENGCOM
Code 18B9
2155 Eagle Drive
Post Office Box 190010
North Charleston, SC 29419-9010

RE: Decision Document for Area of Concern #1 - Former Plating Area, Building 1000 for the Naval Air Warfare Center, Indianapolis, Indiana.

Dear Mr. Loop:

The United States Environmental Protection Agency (USEPA) has reviewed the Decision Document (DD) for Area of Concern (AOC) #1 - Former Plating Area, Building 1000 for the Naval Air Warfare Center (NAWC), Indianapolis, Indiana. The DD was received on May 14, 1999. The USEPA concurs with the remedy that the Navy has selected. Additionally, the Institutional Control Plan in Appendix C provides the assurance that the monitoring and enforcement of the institutional controls will ensure the protectiveness of the selected remedy.

In Section 3.0 - Responsiveness Summary, please include a copy of the USEPA's and the Indiana Department of Environmental Management's (IDEM) comments on the proposed plan/DD and the Navy's responses to the comments.

After the DD is signed, it should be added to the administrative record files. In addition, to comply with CERCLA, the lead agency should publish a notice of availability of the DD in a local newspaper.

If you have any questions concerning this letter, please feel free to contact me at (312) 886-6217.

Sincerely,

Denise Boone

Denise Boone
Remedial Project Manager

cc: Sean Grady, IDEM
Alan Shoultz, SOUTHDIV
Mark Sladic, TtNUS

TETRA TECH NUS, INC.
661 Andersen Drive ▪ Pittsburgh, Pennsylvania 15220-2745
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PITT 05-9-101

May 13, 1999

Project Number 7173

Department of the Navy
SOUTHNAVFACENGCOM
ATTN: Carl Loop (Code 1871)
2155 Eagle Drive
North Charleston, South Carolina 29406

Reference: CLEAN Contract Number N62467-94-D-0888
Contract Task Order 0012

Subject: Decision Documents for AOC 1
Naval Air Warfare Center Indianapolis

Dear Mr. Loop:

In accordance with your request, please find enclosed three copies of the revised finalized Decision Document for AOC 1. The second stand-alone document in this submittal is the Institutional Control Manual. The ICP for AOC 1 is now an appendix to the Decision Document for AOC 1. We believe the ICM is compliant with the most recent comments (April 8) provided by U.S. EPA. Upon regulatory concurrence, it is the Navy's intent to proceed as quickly as possible to complete the Decision Documents for the other AOCs in Parcel 1. These include AOCs 5, 6, 7, 8, 9, 15, 17, and 18.

The U.S. Navy has agreed with the proposed revisions specified in U.S. EPA's April 8 letter and incorporated these into the revised document.

If you have any questions, feel free to call me at (412) 921-8216.

Sincerely,

Mark Sladic, P.E.
Task Order Manager

MS/gp

Enclosures

cc: Sean Grady, IDEM (w/enclosure)
Denise Boone, USEPA (w/enclosure)
Alan Shoultz (w/o enclosures)
File 7173

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FIGURES

NUMBER **PAGE NO.**

ACRONYMS

AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirements
BCT	BRAC Clean-up Team
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIP	Community Involvement Plan
CFR	Code of Federal Regulations
COPC	Chemicals of Potential Concern
DCE	Dichloroethene
DOD	Department of Defense
IDEM	Indiana Department of Environmental Management
IR	Installation Restoration
MCL	Maximum Contaminant Level
mg/kg	milligram per kilogram
NAVFAC	Naval Facilities Engineering
NAWC	Naval Air Warfare Center Command
NCP	National Contigency Plan
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethene
PRG	Preliminary Remediation Goal
RAB	Restoration Advisory Board
RBC	Risk Based Concentration
RI	Remedial Investigation
RCRA	Resource Conservation and Recovery Act
SOUTHDIV	Southern Division, Naval Facility Engineering Command
SSL	Soil Screening Level
TCA	1,1,1-Trichloroethane
TCE	Trichloroethene

USEPA	U.S. Environmental Protection Agency
USGS	United States Geological Survey
VOC	Volatile Organic Compound

1.0 DECLARATION OF THE DECISION DOCUMENT

1.1 SITE NAME AND LOCATION

AREA OF CONCERN ONE (AOC1)
FORMER PLATING AREA, BUILDING 1000
NAVAL AIR WARFARE CENTER (NAWC) INDIANAPOLIS
INDIANAPOLIS, INDIANA

1.2 STATEMENT OF BASIS AND PURPOSE

This Decision Document presents the selected remedial action for the former plating area in Building 1000 (AOC1) at the NAWC Indianapolis, Indianapolis, Indiana, developed in accordance with CERCLA, as amended by SARA, to the extent practicable, and the National Contingency PIan. This decision is based on the administrative record for this Site, at the Warren Library, Indianapolis, Indiana.

The State of Indiana and the U.S. EPA concur with the selected remedy.

1.3 ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Decision Document, may present an imminent and substantial endangerment to public health, welfare, or the environment.

1.4 DESCRIPTION OF THE SELECTED REMEDY

AOC 1 encompasses contamination in the former plating area of Building 1000. Based on current Site conditions, it has been determined that future risk to human health and the environment would be within acceptable limits assuming continued industrial use of the property. Therefore, no further remedial action beyond the implementation of those institutional (i.e. land use) controls specified in this document is planned.

The major components of those institutional controls selected for implementation include:

- Restricting future land use to non-residential purpose to specifically include, but not limited to, the prohibition of playgrounds, day care facilities and facilities for the elderly.

- Prohibiting the use of groundwater in the shallow and intermediate aquifers.

- A requirement for the restoration of the building foundation after any construction or demolition activities in order to maintain the continuity of the foundation as a cap for underlying soils.

- Retention of a right of access by the Navy, and Federal and State regulators for purposes of undertaking future environmental investigations, inspections and/or remedial actions.

1.5 STATUTORY DETERMINATION

Because this remedy will result in the contamination remaining on-site, the Navy will conduct a review every five years after the commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

1.6 DECLARATION

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes alternative solutions and treatment technologies to the maximum extent practical for this site. However, because active treatment of the principal threats of the site was not found to be practical, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. The size, location, and amount of contamination found at AOC 1 precludes a remedy in which contaminants could be treated effectively.

Carl Loop — 9 June 1999

Carl Loop, US Navy, Southern Division (SOUTHNAVFACENGCOM)
BCT Member — Date

Concurrence:

Denise Boone — 6-9-99

Denise Boone, USEPA, Region V
BCT Member — Date

Sean Grady — 6-9-99

Sean Grady, Indiana Department of Environmental Management
BCT Member — Date

2.0 DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND DESCRIPTION

NAWC Indianapolis is located in Marion County, east of downtown Indianapolis within a predominantly residential/commercial area (See Figure 2-1). NAWC Indianapolis is bordered by East 21st Street to the north, Arlington Avenue to the west, East 16th Street to the south, and a small waterway, Windsor Branch, to the east. Most of the commercial establishments within the immediate vicinity of NAWC Indianapolis are located along East 21st Street or Arlington Avenue. Businesses in the area include gas stations, car washes, dry cleaners, and office buildings. The areas immediately beyond the businesses lining East 21st and Arlington Avenue are predominantly residential, as are the areas south and east of the NAWC.

In late 1995, the Department of Defense decided to place the NAWC Indianapolis on the base realignment and closure list. This initiated the conversion of the facility from a government-owned and operated facility to the private sector. The NAWC Indianapolis is currently under the direction of Raytheon, under lease from the City of Indianapolis, who, in turn, leases the property from the U.S. government. Figure 2-2 shows a layout of NAWC Indianapolis and the location of AOC 1.

The ground surface at NAWC Indianapolis is generally flat, sloping slightly from the northern boundary toward the southeast. Surface water drainage at the facility mostly occurs as overland flow during heavy precipitation events. This overland flow is collected and routed through a storm sewer system to two discharges locations: (1) a nearby stream to the southeast of the facility via permitted spillways and an off-site storm sewer system; and (2) a water retention pond in the southwest portion of the site. The retention pond was constructed to facilitate surface water infiltration and to alleviate ponded water on the facility grounds.

The unconsolidated glacial overburden is approximately 150 feet thick at the facility and is comprised of three aquifers or aquifer zones, namely the shallow aquifer zone, middle aquifer and deep aquifer. Each of these varies in thickness, composition, and horizontal extent throughout the site area. The shallow aquifer may be unconfined or semi-confined in some areas where it is near to the ground surface or where it is not overlain by till or other low permeability materials. The shallow aquifer ranges in thickness from 0.5 to 25 feet; the middle aquifer ranges in thickness from 1 to 34 feet; and the deep aquifer ranges in thickness from 5 to 26 feet. The shallow and middle aquifers are only believed to be horizontally continuous on the eastern and southern portions of NAWC Indianapolis, whereas the deep aquifer is

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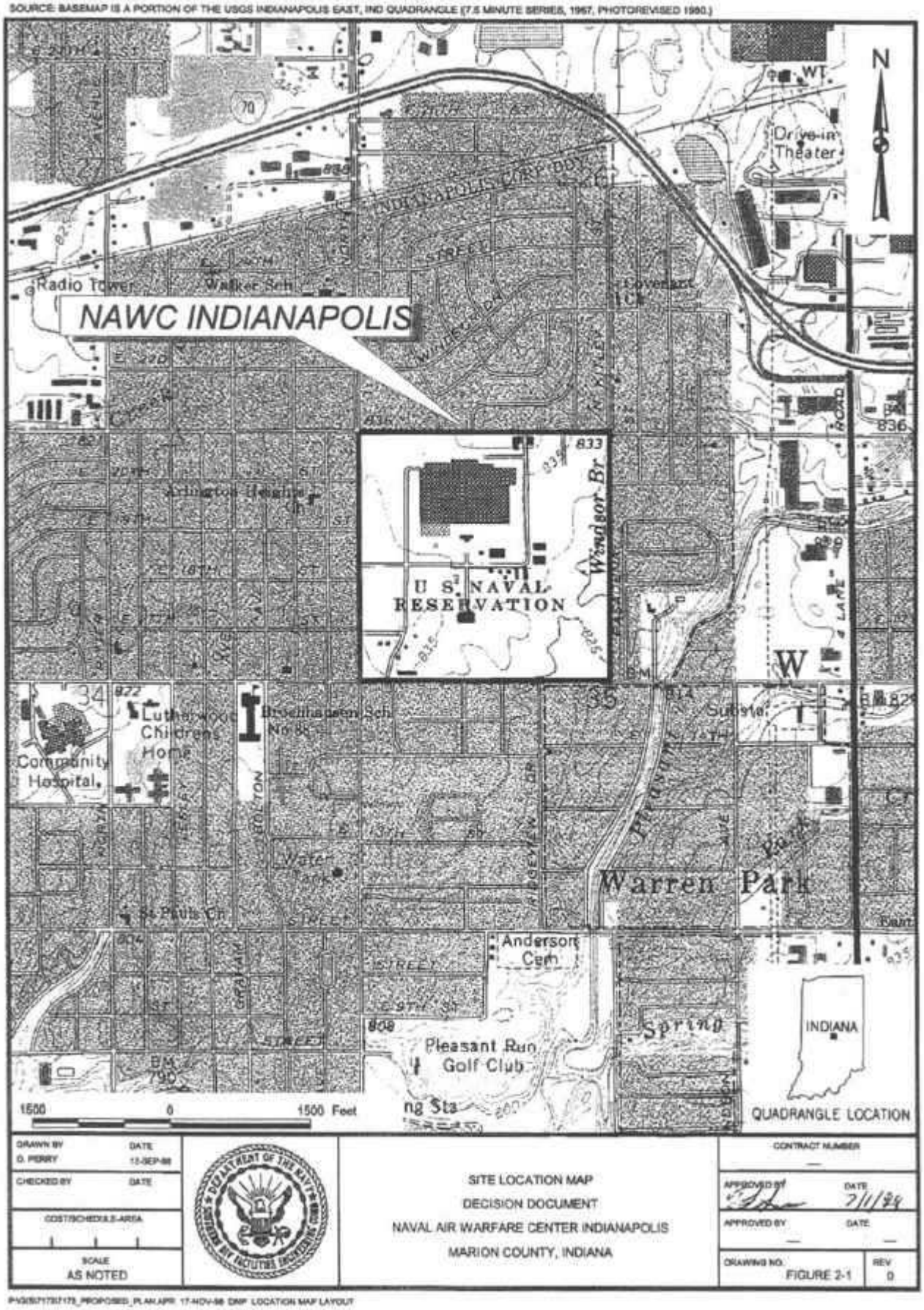
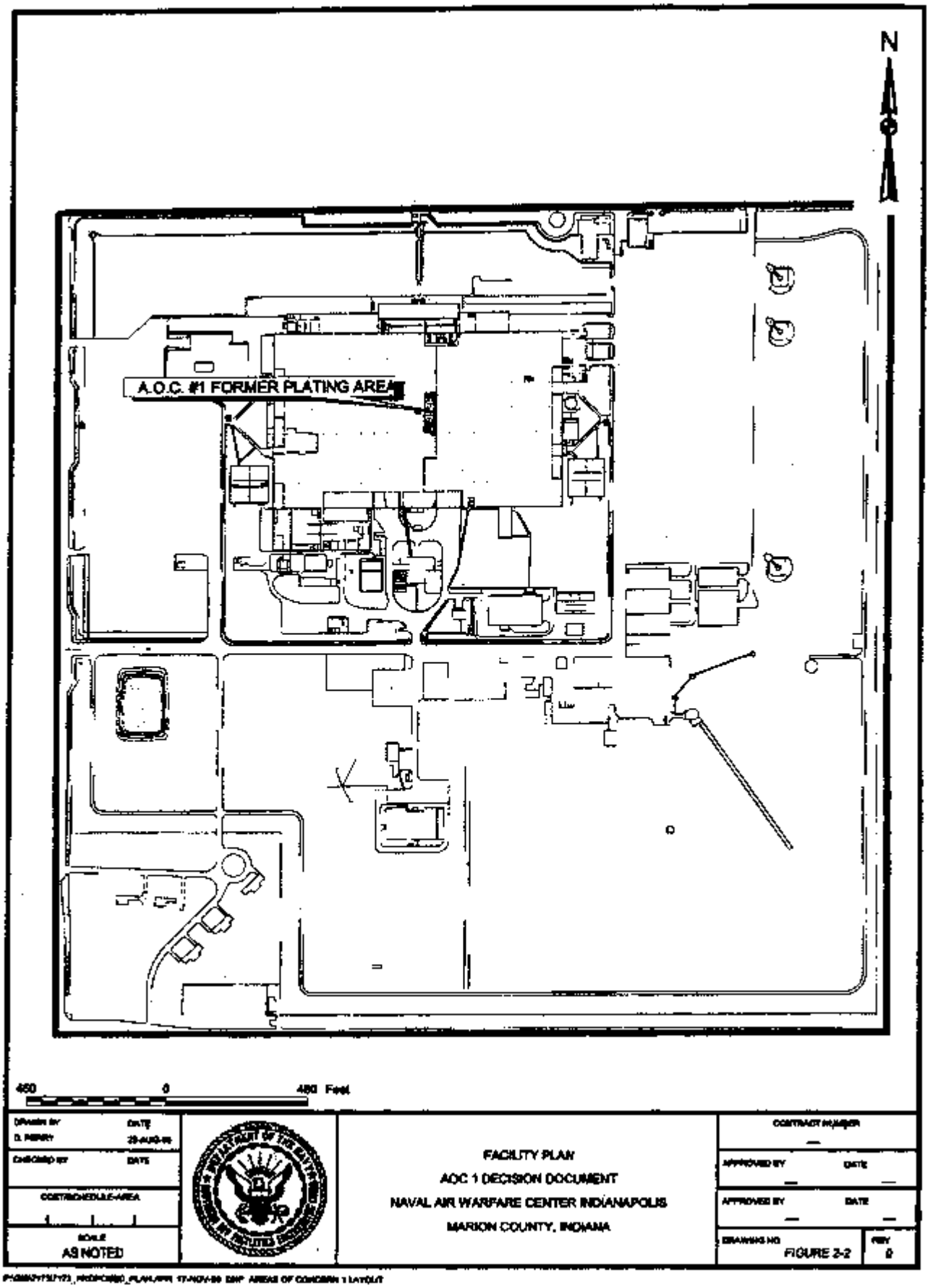
SOURCE: BASEMAP IS A PORTION OF THE USGS INDIANAPOLIS EAST, IND QUADRANGLE (7.5 MINUTE SERIES, 1967, PHOTOREVISED 1980.)



P:\GIS\71737173_PROPOSED_PLAN.APR 17-NOV-98 DMP LOCATION MAP LAYOUT


N
A.O.C. #1 FORMER PLATING AREA
450
0
450 Feet
D. PERRY
AS NOTED
FACILITY PLAN
AOC 1 DECISION DOCUMENT
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA
FIGURE 2-2
0

expected to be horizontally continuous throughout the entire NAWC. Each of these aquifer zones are separated by low permeable glacial till aquitards. The aquitard between the shallow and middle aquifers ranges in thickness between 15 to 19 feet and the aquitard between the middle and deep aquifer ranges between 23 and 41 feet thick.

The groundwater flow direction across the facility in the shallow and middle aquifer zones is generally to the southeast and south, while flow in the deep aquifer is southwest. Basewide potentiometric surface maps for the shallow aquifer zone are presented in Appendix A. It is likely that groundwater in the shallow aquifer discharges into Windsor Branch and Pleasant Run to the east and southeast of the facility. The average horizontal hydraulic gradient for the shallow aquifer was 0.0071 ft/ft on December 10, 1996 and 0.0116 ft/ft on September 27, 1997. The average horizontal hydraulic gradient is 0.014 ft/ft in the middle aquifer, and 0.005 ft/ft in the deep aquifer. The average vertical gradient between monitoring wells screened in the shallow and middle aquifer is 0.5 ft/ft downward in the north-central and southern edges of the NAWC. Between the shallow and middle aquifers, the average vertical gradient in the northeastern corner of the NAWC is 0.13 ft/ft upward. This upward gradient indicates potential recharge of Windsor Branch immediately east of the NAWC from the shallow aquifer. The average hydraulic gradient between the middle and the deep aquifer is 1.3 ft/ft. For additional information on the geology and hydrogeology at the NAWC Indianapolis please refer to B&R Environmental (1997) and USGS (1997, 1998).

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The former plating area, located roughly in the center of building 1000, was in operation from 1942 until 1965. Spent plating solutions and dilute plating rinses were routinely discharged to the sanitary sewer through recessed concrete floor trenches, sloped to drains. During renovation of the area following relocation of plating activities in approximately 1965, the floor drains were observed to be deteriorated, apparently from the corrosive action of plating solutions. During operation, heavy metal plating solutions were used, cyanide-based plating solution use was common, and a chlorinated solvent degreaser was operated.

When the area was renovated, the floor was modified including concrete filling of the floor trenches to bring the floor up to level grade. No historical data for the environmental condition of the area was available. No environmental sampling was completed during the 1965 renovation.

The area is currently an enclosed Computer Aided Design/Drafting (CADD) work area. A raised, false floor is installed over electrical wires and control cables. Additionally, the adjoining former painting area, now a central stores location and a welding shop, was an area where paint solvents were in regular use. The former paint area is immediately to the south of the former plating area. Although paint solvents were in use in the painting area, the most likely source of potential contamination affecting the former painting area is from the neighboring plating area, based on process descriptions.

The NAWC Indianapolis, under the office of the Chief of Naval Operations (CNO) initiated an Environmental Compliance Evaluation (ECE) program to identify environmental compliance deficiencies, provide recommendations for corrective action, and establish a basis for future budgets. The first ECE was performed in October 1991. The next ECE was performed in 1994, at which time a total of 21 environmental media/program areas were evaluated. The ECE's are maintained on site. Environmental programs and procedures were typically updated to meet ECE deficiencies.

In anticipation of the transfer from the government to the private sector, an Environmental Baseline Survey (EBS) was prepared by Brown & Root (B&R) Environmental (March 1996) to document the results of a modified Phase I environmental site assessment. The site assessment was performed in accordance with the U.S. Department of Defense (DOD) requirement for property intended to be sold, leased, transferred or acquired. The EBS reported findings on the status of the NAWC Indianapolis property and off-base property based on visual inspections and a review of records.

The Remedial Investigation began with the collection of Phase I environmental samples from October through December 1996. Additional samples were added in September 1997. A Phase I Remedial Investigation report was issued in December, 1997 which presented the analytical results and evaluated the potential human health risks associated with the NAWC facility. Based on these findings, additional Phase II samples were collected. At selected areas during the spring and summer of 1998. The results from the Phase II sampling were reported in the Phase II Remedial Investigation report, November 1998.

2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

A Community Involvement Plan (CIP)(May 1997) was developed for NAWC Indianapolis that identifies a program to establish communication and information exchange between the Navy, and various federal, state and local agencies, and community agencies; and the public. Specifically, this provides a mechanism for the exchange of information between the BRAC Cleanup Team (BCT) and the public,

primarily through the Restoration Advisory Board (RAB). The BCT and RAB periodically hold public meetings to provide full exchange of information and to provide an opportunity for public comment.

The Navy solicited input from the community for the Proposed Plan (TtNUS, 1998) on the selected alternative. The Navy originally set a public comment period from September 28, 1998 to October 27, 1998, and later extended it until November 11, 1998, to encourage public participation in the selection process. The comment period included a public meeting at which the Navy, with the EPA and IDEM, presented the Proposed Plan, answered questions, and accepted both oral and written comments. The public meeting was held on October 14, 1998 7:00 PM to 9:00 PM from at the Quality Inn East at 3525 North Shadeland Avenue in Indianapolis.

As indicated by the public notices, all documents pertinent to AOC 1 were made accessible to the public at the information repository located at the Warren Branch Library, 9701 East 21st Street, Indianapolis, Indiana.

2.4 SCOPE AND ROLE OF ACTION

The sites that required environmental investigations as part of the Remedial Investigation at NAWC Indianapolis comprised eighteen areas of concern and one Installation Restoration (IR) site. This Decision Document addresses the contamination of the soil and groundwater associated with one AOC: AOC 1 - Former Plating Area, Building 1000. This AOC was determined in the RI to be a relatively low risk site within the NAWC Indianapolis facility. The objective of the action described in this Decision Document is to maintain this low level of risk by controlling the site for non-residential uses. The AOC will be addressed independent of the other AOCs and the IR Site. The other AOCs will be addressed in other Decision Documents, and the basewide groundwater conditions will also be evaluated in a separate document.

2.5 SUMMARY OF SITE CHARACTERISTICS

2.5.1 Geology

The geology of the AOC 1 is consistent with the geology found across the NAWC facility. Due to the shallow investigation depth, borings installed in AOC 1 only partially penetrated through the unconsolidated surficial fill and glacial deposits. Descriptions of the soil samples recorded on the boring

logs indicate that across AOC 1, brown to gray silty clay with trace gravel was the predominant lithology encountered from the ground surface down to approximately 12 to 14 feet bgs.

2.5.2 Hydrogeology

No permanent monitoring wells were installed in AOC 1, thus hydraulic gradients, groundwater flow directions or velocity could not be determined at this site. According to visual observations of the soil moisture content in subsurface soil samples, the water table was encountered between 12 and 14 feet bgs. Groundwater flow in the shallow aquifer is expected to mimic the relatively flat surface topography and flow to the southeast and mimic the southeast flow direction determined for the surrounding Areas Of Concern. It is believed that groundwater in the shallow aquifer will discharge into Pleasant Run.

2.5.3 Site Inspection of Building 1000: Former Plating Shop (AOC 1)

On November 14, 1996 a review of the design drawings for the former plating shop area, located in the center of Building 1000, was completed on site. At the time of the inspection this area was used for the CADD department and for office supply and storage. The design drawings from 1941 depicted a degreaser trench approximately 37 feet north of the G12 column line, located in the current CADD department. Sampling or inspection in this room would have been difficult and extremely disruptive to facility operations, and thus no further investigation was performed in this room.

The office supply and storage room directly south of the CADD department was also previously plating operations support functions. The process drain line from the plating area was routed underneath this area. The concrete floor in this area showed floor excavations and cracks have been filled and painted over. A soil boring and temporary well was placed in this area and soil samples and a groundwater sample were collected from beneath the building during the Phase I RI. The process drain line is reported to be buried to a depth of approximately four feet below the floor. Location of the boring adjacent to the drain line was made possible by locating a process line clean-out. One soil sample and the groundwater sample were collected below this depth. Investigation of this area served the dual role of determining if the drain line served as a migration conduit for any contamination, and also if any free product was trapped between the interface of the bottom of the floor and the top of the native soils.

2.5.4 Nature and Extent of Contamination

This section presents the results of the sampling and analysis of environmental samples collected at AOC 1. All data were validated according to EPA National and Region V guidelines.

Surface and Subsurface Soil

One surface and two subsurface soil samples were collected from one direct push soil boring (AOC01-DP01) and submitted for analysis. The boring was advanced in the office supply and storage room, located directly south of the CADD department and previously used for plating operations support functions, where the CADD area itself was used for actual plating operations. The flooring in this area is concrete and showed floor excavations and cracks had been filled and pained over. No positive PID readings were noted during the advancement of boring AOC01-DP01.

Surface Soil Characterization

Bis(2-ethylhexyl) phthalate (C_{max} = 61 µg/kg), butylbenzyl phthalate (C_{max} = 51 µg/kg), and several metals were detected in the AOC 1 surface soil sample. The phthalate compounds are common plasticizers often found in environmental samples because of the widespread use and disposal of plastics in our environment. Butylbenzyl phthalate was the only chemical detected at a concentration exceeding those detected in the background dataset (butylbenzyl phthalate was not detected in background). The metals concentrations reported are similar to or lower than those reported in the background dataset. None of the positive detections reported exceed the established limits.

Subsurface Soil Characterization

Trichloroethene (C_{max} = 38 µg/kg) and several inorganics were detected in the subsurface soils collected at depths of 2 to 4 feet and 6 to 8 feet bgs. The process drain line is reported to be at a depth of four feet below the floor. Only results trichloroethene and hexavalent chromium (C_{max} = 2.7 mg/kg) for the soil sample collected from 6 to 8 feet bgs exceeded concentrations reported for the background dataset. However, none of the positive detections reported exceed the established limits.

Groundwater

One groundwater sample was collected from the temporary well installed at AOC01-DP01; the well was screened at 6 to 11 feet bgs. Chlorinated solvents (1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, and trichloroethene), toluene, bis(2-ethylhexyl)phthalate, and several unfiltered metals were detected in this groundwater sample. Concentrations of 1,1-dichloroethene, trichloroethene, aluminum, antimony, arsenic, beryllium, chromium, iron, lead, manganese, and nickel exceeded concentrations noted in the background dataset as well as one or more of the benchmarks (e.g., Federal Safe Water Drinking Act Maximum Contaminant Levels (SWDA MCLs), IDEM Tier II clean-up goals). The solvents are consistent with the past plating operations in the area. However, it should be noted the VOC concentrations do not exceed 60 µg/L for any individual compound. Additionally, the elevated aluminum, iron, and manganese concentrations in the groundwater suggest that the metals concentrations noted may actually reflect turbidity. As noted previously, metals are not significant contaminants in AOC 1 surface or subsurface soils.

2.6 SUMMARY OF SITE RISKS

During the RI, an analysis was conducted to estimate the health or environmental problems that could result if the soil and groundwater contamination at AOC 1 was not mitigated. This analysis is commonly referred to as a Baseline Risk Assessment. In conducting this assessment, the focus was on health effects that could result from exposure to the soil and groundwater contaminants in both an industrial and a residential setting. The industrial setting considered the exposure by on-site workers, construction workers and adolescent trespassers. Residential exposure considered on-site exposure to the soil by future use of the site as residential property. At AOC 1, three soil samples were collected from one boring at the AOC, and two groundwater samples were collected. In samples collected during the RI, contaminants were detected in the soils and in the groundwater beneath AOC 1.

The concentrations were compared to risk assessment criteria for residential and non-residential use. Criteria that were used to evaluate the data were Drinking Water Standard Maximum Contaminant Levels (MCLs), EPA Region III Risk Based Concentrations (RBCs), EPA Region IX Preliminary Remediation Goals (PRGs), IDEM Tier II Goals, and site-specific background concentrations. In addition, EPA Generic Soil Screening Levels (SSLs) and IDEM Tier II Goals were used to evaluate risks associated with the potential for a chemical to migrate from the soil to the groundwater. If a chemical concentration in groundwater or soil was found to be greater than one of the criteria (or 10% of PRG or RBC in the case of

non-carcinogens), then the chemical was designated as a Chemical Of Potential Concern (COPC) and was considered for further risk analysis.

Based on the laboratory analyses, COPCs detected in the groundwater from a temporary well nearest to AOC 1 included 1,1-dichloroethane (DCE) (22 µg/L), trichloroethene (TCE) (55 µg/L), aluminum (43,200 µg/L), antimony (5.2 µg/L), arsenic (54.9 µg/L), beryllium (2.5 µg/L), chromium (110 µg/L), lead (30.2 µg/L), manganese (1,730 µg/L), nickel (130 µg/L), vanadium (97.7 µg/L), and zinc (447 µg/L). The temporary well was screened in the upper portion of the shallow aquifer consisting of silty sand. In the second phase of the RI, one permanent monitoring well (AOC01MW02) was installed about 100 feet downgradient of the AOC and another permanent monitoring well (AOC01MW01) was installed about 300 feet downgradient of the AOC. Using groundwater flow direction data collected during Phase I of the RI, the location of the permanent well AOC01MW02 was placed at the closest downgradient position (considering building/access constraints) in order to detect any contaminants in groundwater emanating from the AOC. A permanent monitoring well with a longer well screen (compared to the temporary well in Phase I) was installed during Phase II because the groundwater sample collected from the permanent well is more representative of in situ groundwater quality than samples collected from the temporary well. In the downgradient permanent monitoring well (AOC01MW02), the only compound detected at a concentration greater than one of the criteria was manganese (219 µg/L), all other compounds were either below laboratory detection limits or were less than the screening criteria. In the other downgradient permanent monitoring well (AOC01MW01), all chemical concentrations were less than the criteria.

The groundwater sample results from the downgradient permanent monitoring well AOC01MW02 were significantly less than the results from the sample collected from the temporary well. Only manganese was detected at a concentration greater than one of the criteria. However, the concentration is within the site-specific background concentration so manganese in the groundwater is not considered to be the result of site operations.

The operations at AOC 1 were removed more than thirty years ago in 1965, and based on the groundwater results there has been little migration of contaminants in the groundwater. Since contaminants must travel nearly 150 feet further to the southern edge of the building and more than 1,800 feet further to the property line, any contaminants are expected to stay within the site. Risks based on off-site residential use of the groundwater were not evaluated. There are no on-site domestic or water removal wells and the area is serviced by a public water supplier so risks by on-site consumers (present or future) were not evaluated

No COPCs were detected in soil samples. The most restrictive criteria that were used for determining the COPCs use a risk level of 1.0×10^{-6} in the calculation of the criteria. Thus, it was not necessary to calculate risk levels since the risk of exposure for any receptor is less than the EPA criteria of 1.0×10^{-6}.

Cancer risks for construction workers exposed to groundwater (based on concentrations from the temporary well) were 2.0×10^{-8} which is below EPA's target risk range of 10^{-4} to 10^{-6}. The Hazard Index (HI) for construction workers exposed to groundwater was 0.013 which is less than unity indicating that no toxic effects are anticipated for this receptor.

The planned future use of the site is industrial, so the risks based on those uses were given more consideration than residential use. Alternatives for addressing the site were based on the continued industrial use of the site.

No ecological risk evaluations were performed because the AOC is located within the building, the groundwater plume is contained within the building footprint and ecological exposures are negligible.

The summary of the analytical results and risk assessment tables from the RI report are included in Appendix B. A figure depicting the sample locations is also provided in Appendix B.

2.7 DESCRIPTION OF ALTERNATIVES

The alternatives for AOC 1 are presented below. Note that the RI for NAWC Indianapolis has been completed, but the Feasibility Study has not been developed. These alternatives were presented in the Proposed Plan (TtNUS, 1998). The alternatives that were considered are as follows:

- Alternative 1: No Action
- Alternative 2: Institutional Controls

2.7.1 Alternative 1: No Action

The "No Action" alternative is evaluated at every site to establish a baseline for comparison. Under this alternative, no further action would be taken to prevent exposure to the contamination in the soil and groundwater.

There are no capital costs, operations and maintenance costs, and present worth costs associated with this alternative. There is no implementation time associated with this alternative.

2.7.2 Alternative 2: Institutional Controls

Institutional controls will be put in place to maintain the industrial use of the site. The alternative is consistent with the proposed use the property in the future. The institutional controls consists of deed restrictions that include:

- a clause restricting the land use to non-residential and specifically prohibiting uses such as, but not limited to, day care facilities and facilities for the elderly.

- a clause prohibiting the use of groundwater in the shallow aquifer and the middle aquifer. Wells can be screened only in the bedrock aquifer or totally within the thickness of the sand and gravel directly adjacent to the bedrock. Deep wells shall be constructed in strict accordance with state regulations.

- a clause requiring restoring building foundations after any construction to maintain the continuity of the foundation as a cap for the underlying soils. Any subsurface construction or excavation shall be performed in accordance with all applicable Federal, state and local human health and safety and environmental laws.

- a clause retaining the rights of access by the Navy, and Federal and State regulators for environmental investigations, inspections and/or remedial actions.

The existing foundation is continuous over the area of the AOC and the Main Building. This foundation acts as a barrier that prevents exposure to the soils and groundwater. Soil and groundwater samples that were evaluated in the Baseline Risk Assessment were collected from below the existing foundation.

An Institutional Controls Plan (ICP) has been prepared to ensure the long term effectiveness of the institutional controls. The plan was developed according to EPA guidance. This plan includes a description of the areas controlled by the deed restrictions, description of site, identification of residual risk(s) presented, types of ICs imposed, proposed deed language implementing ICs, party responsible for monitoring the integrity and effectiveness of imposed control(s), procedures for reporting and enforcing

against IC violations, assurances regarding completion of the CERCLA five-year review process, IC recordation / notice requirements, and commitment to pre-transfer meeting.

Since contamination will remain on site and a remedial action, institutional controls, is implemented, a five-year review of the remedy is required. No routine monitoring is proposed for AOC 1 since the groundwater data, as reported in the RI report and Phase II Technical Memorandum, shows that there were no detections of contaminants above screening levels at sampling locations immediately downgradient of AOC 1.

There are no capital costs associated with this alternative although there will be some costs associated with routine administration and the five-year review (presented below). The implementation time to prepare and finalize the deed restriction language is estimated to be two months.

Note that this alternative does not employ any treatment or removal technologies. Human health and the environment is protected by this remedy without the need for further physical changes.

Total Five Year Costs(1)

	Total hours	Labor Costs	Airfare/Lodging per diem/auto costs	AOC 1(2) Costs
Routine Administration	10	$350		
Parcel Transfer				
Trip 1	12	$420	$556	
Trip 2	12	$420	$556	
Five Year Review	12	$420	$556	
Problem Resolution				
Number 1	12	$420		
Number 2	12	$420		
Total		$2,450	$1,667	$1,647

1 Total five year costs included costs associated with AOC 1, AOC 5, AOC 6, AOC 7, AOC 8, AOC 9, AOC 15, AOC 17, and AOC 18.

2 AOC 1 costs are based as a percentage (40%) of the total five year costs.

2.7.3 Other Alternatives

The current use of the facility and site is industrial. The intended future use of the site is industrial and the intended use of the facility is non-residential. Alternative 2 - Institutional Controls was evaluated and found to be protective of human health and the environment.

As required by the NCP, other alternatives were considered but were determined by the BCT to be not appropriate for the levels of contamination found at the AOC. Since Alternative 2 is protective of human health and the environment, no other alternatives were evaluated in detail. Other alternatives are variations of groundwater treatment, such as pumping and treating, air sparging with vapor recovery, air sparging without vapor recovery, and biosparging for in situ biological treatment. All of these alternatives share several general characteristics. All require capital expenditure for wells and treatment equipment. All require annual operating costs for utilities, chemicals, labor, maintenance and laboratory analysis. All require locating equipment and piping around active portions of the plant, potentially interfering with future uses of the plant. All require an implementation time of six to twelve months for design, bidding, procurement, installation and start-up.

Any of these other alternatives can be expected to be evaluated favorably with the nine criteria. However, the resulting protection of human health and environment is the same as the institutional controls. The costs for implementation of treatment alternatives provide no additional benefit compared to the institutional controls. Thus, a detailed evaluation of treatment alternatives was not made and treatment alternatives were not considered further.

2.8 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The preferred alternative for AOC 1 is Alternative 2 - Institutional Controls. Based on current information, this alternative would appear to provide the best balance of trade-offs among the alternatives with respect to nine criteria that EPA uses to evaluate alternatives. This section profiles the performance of the preferred alternative against the nine criteria, noting how it compares to the other alternatives under consideration. The nine criteria are summarized below.

Overall Protection of Human Health and Environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.

Compliance with ARARs addresses whether or not a remedy will meet all of the Applicable or Relevant and Appropriate Requirements of other Federal and State environmental statutes and/or provide grounds for invoking a waiver.

Long-term effectiveness and performance refers to the magnitude of residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies that may be employed in a remedy.

Short-term effectiveness refers to the speed which the remedy achieves protection, as well as the remedy's potential to create adverse impacts on human health and the environment that may result during the construction and implementation period.

Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the chosen solution.

Cost includes capital and operations and maintenance costs.

State Acceptance indicates whether, based on its review of the RI and Proposed Plan, the State concurs with, opposes, or has no comment on the preferred alternative.

Community Acceptance will be assessed in the Record of Decision following a review of the public comments received on the RI Report, the Phase II Technical Memorandum (TtNUS, August 7, 1998) and the Proposed Plan.

2.8.1 Analysis

Overall Protection of Human Health and Environment. All of the alternatives, except for the "no action" alternative would provide adequate protection of human health and the environment by implementing institutional controls or by removing the contaminants. The preferred alternative would implement institutional controls to minimize contact with the contaminants.

Compliance with ARARs. The preferred alternative is in compliance with Federal and State ARARs.

Long-term effectiveness. The preferred alternative would be effective in the long run since the deed restrictions would be maintained through the implementation of an Institutional Controls Plan (Appendix C).

The “no action” alternative provides no long-term safeguards against exposure. Therefore, the alternative will not be considered further.

Reduction of toxicity, mobility, or volume through treatment. The preferred alternative offers no change in the toxicity, mobility or volume of contaminants.

Short-term effectiveness. The preferred alternative can be instituted in a relatively short time. There is no change in the situation while waiting for implementation.

Implementability. The preferred alternative has few administrative issues that will affect its implementation. Deed restrictions have been used in the past at other facilities.

Cost. The preferred alternative has no capital cost and no annual operations and maintenance costs. The costs associated with the five year review are $1,647.

State Acceptance. The preferred alternative is in compliance with States ARARs. The State has viewed the preferred alternative favorably.

Community Acceptance. Community acceptance of the preferred alternative and the other alternatives are based on comments on the Proposed Plan. The Restoration Advisory Board (RAB) and the public have viewed the preferred alternative favorably.

2.9 SELECTED REMEDY

The selected remedy will provide a satisfactory level of risk relative to the current and future intended uses of the site. The level of risk is maintained but with little expenditure. The existing concrete foundation acts as a barrier to exposure to soils and groundwater: The existing data shows that there is no detection of contaminants above screening levels at sampling locations immediately downgradient of AOC 1. The

selected remedy is believed to provide the best balance in trade-offs among the alternatives with respect to the evaluation criteria. The selected remedy, however, does not require the removal or containment of contaminants, and review of the site will be required.

Alternatives that employ treatment were not considered practical since the existing foundation acts as a barrier that prevents exposure to subsurface contaminants reducing the need for removal or treatment.

2.10 STATUTORY DETERMINATION

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practical for this site. However, because treatment of the principal threats of the site was not found to be practical, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. The size, location, and amount of contamination found at AOC 1 precludes a remedy in which contaminants would be treated effectively.

Because this remedy will result in the contamination remaining on-site, the Navy will conduct a review every five years after the commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

3.0 RESPONSIVENESS SUMMARY

A Proposed Plan for AOC 1 was issued in September, 1998. Subsequent to this, the Navy solicited input from the community on the selected alternative. The Navy set a public comment period from September 28, 1998 to October 27, 1998, which was later extended to November 11, 1998, to encourage public participation in the selection process. The comment period included a public meeting at which the Navy, with the EPA and IDEM, presented the Proposed Plan, answered questions, and accepted both oral and written comments. The public meeting was held on October 14, 1998 from 7:00PM to 9:00PM at the Quality Inn East at 3525 North Shadeland Avenue in Indianapolis. As indicated by the public notice for the meeting, all documents pertinent to AOC 1 were made available to the public at the information repository located at the Warren Branch Library, 9701 East 21st Street, Indianapolis, Indiana.

3.1 COMMUNITY PREFERENCES

Comments were received from one person. The comments concurred with the deed restrictions to limit the land use to industrial but expressed concern that the land use could be changed to residential or permit day care facilities without extensive investigation. The comments were general and did not specify an AOC.

3.2 INTEGRATION OF COMMENTS

As these comments concurred with the selected remedies identified, no integration of these comments were warranted.

3.3 COMMENT RESOLUTION

Please refer to the following pages for USEPA and IDEM comments and resolutions.

RECORD OF USEPA AND IDEM COMMENTS AND RESOLUTIONS

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live

Frank O'Bannon
Governor

John M. Hamilton
Commissioner

100 North Senate Avenue
P.O. Box 6015
Indianapolis, Indiana 46206-6015
(317) 232-8603
(800) 451-6027
www.ai.org/idem

April 12,1999

Mr. Carl Loop
Department of the Navy
SOUTHDIV NAVFACENGCOM
Code 18E2BM
2155 Eagle Drive
Post Office Box 190010
North Charleston, SC 29419-9010

Dear Mr. Loop:

Re: Decision Document for Area of Concern #1 - Former Plating Area

Staff of the Indiana Department of Environmental Management (IDEM) have reviewed the above referenced document and have determined that it is acceptable providing the Navy addresses the following comments:

GENERAL COMMENTS

Decision Document and Institutional Control Plan (ICP)

There are a few minor typographical and spelling errors that need correction.

It needs to be stated under what conditions the required five-year review and the ICP will no longer be necessary and controls may be lifted from the property.

There is no contingency for monitoring groundwater to determine if the site conditions still warrant institutional controls, or increased controls. It must be stated that groundwater monitoring will be performed prior to the five-year review period and prior to the cessation of institutional controls. Costs for implementing the monitoring need to be reflected in the document.

A statement is needed that requires the regulatory agencies and the public to be notified if the Navy has been requested, or is considering, to change the property classification from industrial to *"residential or residential type uses"* after implementation of the ICP.

SPECIFIC COMMENTS

Decision Document

Page 1-2, Section 1.6, second sentence on, and page 2-19 section 2.10, first paragraph, last sentence: *"This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practical for this site. However, because treatment of the principal threats of the site was not found to be practical, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. The size, location, and amount of contamination found at AOC 1 precludes a remedy in which contaminants could be treated effectively."* To clarify the remedy, the following language changes are needed: "This remedy utilizes alternative solutions and treatment technologies to the maximum extent practical for this site. However, because active treatment of the principal threats of the site was not found to be practical, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. The size, location, and amount of contamination found at AOC 1 precludes a remedy in which contaminants could be actively treated effectively."

Page 1-2, Section 1.6, end: A signatory line for EPA and IDEM concurrence of the Decision Document is required after the Navy signatory line.

Page 2-4: "This page left intentionally blank." is needed.

Page 2-8, Section 2.4, second to last sentence: *"...and the IR."* "Site" must be added to the end of the sentence.

Page 2-9, Section 2.5.2, second to last sentence: "Groundwater flow in the shallow aquifer is expected to mimic the relatively flat surface topography, and flow to the southeast." It needs to be added that groundwater flow is expected to mimic the southeast flow direction determined for surrounding Areas of Concern.

Page 2-9, Section 2.5.3, second paragraph, third sentence, and Page 2-10, Surface and Subsurface Soil section, second to last sentence: *"The (concrete floor) flooring in this area (is concrete and) showed no visible signs of disturbance or penetration."* During a site inspection it appeared that floor excavations and cracks in the area had been filled and painted over. Also, as noted in the same document, there is a process line clean out penetrating the floor. Revision of the sentence is required.

Page 2-11, first paragraph, third sentence: *"SDWA MCLs"* needs to be spelled out for the first usage of these acronyms.

Page 2-12, last paragraph, first sentence: *"...there has been little or no migration of contaminants in the groundwater."* Volatile organic contamination was detected in the down gradient temporary monitoring well. The sentence must be revised to remove *"or no."*

Page 2-12, last paragraph, last sentence: *"There are no on-site wells and the area is serviced by a public water supplier..."* The comment must to be modified to clarify that there are no on-site domestic or water removal wells.

Page, 2-13, fourth paragraph: *"No ecological risk evaluations were performed because the A. C. is located within the building..."* It also needs to be added that the groundwater plume is also contained within the building footprint.

Page, 2-15, second full paragraph: This paragraph does not include personnel costs associated with this remedy.

Appendix A, page 1, section C: This paragraph does not state the reasonably anticipated future use at this site.

Appendix A, page 3, section F, first paragraph, last sentence: IDEM does not have enforcement authority for these types of IC violations.

Appendix A, page 3, section F, second paragraph: Preconditions under CERCLA Section 120(h)(3)(A)(B) or (C) were not discussed here. The following is a list of items that should be included in the ICP:

- A description of who will be responsible for monitoring the integrity and effectiveness of the IC's and the frequency of monitoring was not mentioned.
- What is the procedure that will be used to report violations or failures of the IC's to the appropriate EPA/State regulator.
- A description of the procedure to be used to enforce against violations of an IC, identification of the party or parties that will be responsible for such enforcement, and a description of the legal authority for this enforcement procedure.
- A description of recording requirements in the particular jurisdiction and the methods which will be used to provide notice of the institutional controls at the site to a subsequent owner or lessee.

CONCLUSION

Overall, minor changes are needed to produce a technically acceptable document. Minor spelling and other errors need correction. Text additions needed include adding: regulatory signatory concurrence lines, statements that an active remedy was not practicable, outlining under what conditions the ICP can be changed and persons to be notified when it is being considered to be changed, and the addition of a groundwater monitoring program.

Other changes include expanding upon, and clarifying statements on the IR Site, groundwater flow, contaminant migration, and floor cutouts.

If you have any questions concerning this letter, please feel free to contact me at (317) 308-3121.

Sincerely,

Sean K. Grady, Project Manager
Federal Programs Section
Office of Environmental Response

SKG:mg
cc: Alan Shoultz, SOUTHDIV
Mark Sladic, TNUS
Denise Boone, U.S. EPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

SRF-5J

April 8, 1999

Carl Loop
Department of the Navy
SOUTHDIV NAVFACENGCOM
Code 18E2BM
2155 Eagle Drive
Post Office Box 190010
North Charleston, SC 29419-9010

RE: Decision Document for Area of Concern #1 - Former Plating Area, Building 1000 for the Naval Air Warfare Center, Indianapolis, Indiana.

Dear Mr. Loop:

The United States Environmental Protection Agency (USEPA) has reviewed the Decision Document (DD) for Area of Concern (AOC) #1 - Former Plating Area, Building 1000 for the Naval Air Warfare Center (NAWC), Indianapolis, Indiana. The DD was received on March 8, 1999. The preferred alternative that the Navy has chosen is acceptable, however, the Navy must address the following comments:

1. **Decision Document, Table of Content.** Include the Institutional Control Plan (ICP) Manual as an appendix.

2. **Institutional Controls Plan (ICP) Manual, Section 1.0 Purpose.** In the last paragraph, the description of the procedure to modify or extinguish an institutional control is not accurate. The paragraph must be revised to clearly state that any remedy change will comply with the statutory requirements of CERCLA 121. Additionally, the description of the procedure must include references to the appropriate post-DD changes. If significant changes are made to a component of the remedy in the DD, these changes should be documented in an Explanation of Significant Differences (ESD) as required by Section 117(c) of CERCLA and the lead agency must comply with the procedures specified in the NCP Section 300.435(c)(2)(i). If fundamental changes are made to the overall remedy, they must be documented in a DD amendment and the lead agency must conduct the public participation and documentation procedures specified in the NCP Section 300.435(c)(2)(ii) and CERCLA 117.

The plan requires the new owner to submit annual reports to the Navy, but does not specifically identify who or what office in the Navy is to receive those reports. Is there an office within the Navy that will, on a long term basis, receive and review these reports? A response is not necessarily required to this questions, but it may help clarify the responsibilities of the lessee, licensee, or deed transferee.

If you have any questions concerning this letter, please feel free to contact me at (312) 886-6217.

Sincerely,

Denise Boone
Remedial Project Manager

cc: Gabriele Hauer, IDEM
Alan Shoultz, SOUTHDIV
Mark Sladic, TtNUS

TETRA TECH NUS, INC.
661 Andersen Drive ▪ Pittsburgh, Pennsylvania 15220-2745
(412) 921-7090 ▪ FAX (412) 921-4040 ▪ www.tetratech.com

PITT 03-9-043

March 5, 1999

Project Number 7173

Department of the Navy
SOUTHNAVFACENGCOM
ATTN: Carl Loop (Code 1871)
2155 Eagle Drive
North Charleston, South Carolina 29406

Reference: CLEAN Contract Number N62467-94-D-0888
Contract Task Order 0012

Subject: Decision Documents for AOC 1
Naval Air Warfare Center Indianapolis

Dear Mr. Loop:

In accordance with your request, please find enclosed three copies of the finalized Decision Document for AOC 1. The second part of the AOC 1 Decision Document submittal is the Institutional Control Manual and ICP for AOC 1. We believe the ICM is compliant with the most recent information provided by U.S. EPA. Upon regulatory concurrence, it is the Navy's intent to proceed as quickly as possible to complete the Decision Documents for the other AOCs in Parcel 1. These include AOCs 5, 6, 7, 8, 9, 15, 17, and 18.

Additionally, please see responses to IDEM comments. EPA said in a December 1, 1998 letter that they would not provide comments prior to community acceptance, completion of an ICP and finalized DD. The Navy feels these conditions have now all been met.

If you have any questions, feel free to call me at (412) 921-8216.

Sincerely,

Mark Sladic, P.E.
Task Order Manager

MS/gp

Enclosures

cc: Gabriele Hauer, IDEM
Denise Boone, USEPA
Alan Shoultz (w/o enclosures)
File 7173

IDEM COMMENTS REGARDING PROPOSED PLANS (PPs) FOR AOCs 1,5,6,7,8, 9, 15, 17, and 18

GENERAL COMMENTS:

1. **COMMENT:** **Section 7.0 – Community Participation**: In paragraph 2, the third sentence should read: "The Proposed Plan meets the applicable or relevant and appropriate federal and state requirements." In addition, this section should explain how public comments will be addressed. Please verify if a copy of the administrative record is available at the Warren Branch Library. If this is not the case, delete the statement in the last paragraph of this section.

   RESPONSE

a. The Navy agrees. This sentence in question some how got truncated and was missed. This will be corrected in the Decision Document.

b. A paragraph stating how the public comments will be addressed is located at the top of page 7-2. This is compliant with the EPA ROD guidance. No changes to the text are necessary.

c. A copy of the Administrative Record is located in the Warren Branch Library.

SPECIFIC COMMENTS:

AOC5:

1. **COMMENT:** **Section 2.2 – Site History:** The entire sanitary sewer line will be transferred. However, the sewer lines, and the land around the sewer lines (easement), is transferable if the sewer line is within the transfer parcel 1. Clarification in the text is needed.

   RESPONSE: The Navy agrees. This paragraph will be re-written to clarify this issue in the Decision Document.

2. **COMMENT Figure 2.2.** The hatched areas on the map represent the transferable soils around some parts of the sewer system. However, the legend on the figure does not reflect that. A statement explaining that fact is needed in the text of the PP.

   RESPONSE: The Navy agrees. A statement will be added to the text to explain the hatched areas on Figure 2-2. This change will be reflected in the Decision Document.

AOC 7:

1. **COMMENT:** **Section 2.2 – Site History:** The entire sanitary sewer line will be transferred. However, the sewer lines and the land around the sewer lines (easement) is transferable if the sewer line is within the transfer parcel 1. Clarification in the text is needed.

   RESPONSE: The Navy Agrees. This paragraph will be re-written to clarify this issue in the Decision Document.

2. **COMMENT:** **Figure 2-2:** The hatched areas on the map represent the transferable soils around some parts of the sewer system. However, the legend on the figure does not reflect that. A statement explaining that fact is needed in the text of the PP.

   RESPONSE: The Navy agrees. A statement will be added to the text to explain the hatched areas on Figure 2-2. This change will be reflected in the Decision Document.

REFERENCES

B&R Environmental, March 1996, Environmental Baseline Survey - Naval Air Warfare Center Indianapolis, Indiana.

B&R Environmental, June 1996. Community Relations Plan - Naval Air Warfare Center Indianapolis, Indiana.

B&R Environmental, August 1996. Finding of Suitability to Lease and Environmental Baseline Survey for Lease - Naval Air Warfare Center Indianapolis, Indiana.

B&R Environmental, October 1996. Remedial Investigation Work Plan - Naval Air Warfare Center Indianapolis, Indiana.

Supporting documents: Field Sampling Plan
Health and Safety Plan
Quality Assurance Project Plan

B&R Environmental, November 1996. DRAFT Data Management Plan - Naval Air Warfare Center Indianapolis, Indiana.

B&R Environmental, May 1997. Community Involvement Plan, Naval Air Warfare Center Indianapolis, Indiana.

B&R Environmental, November 1997. Phase I Remedial Investigation Report - Revision 1 - Naval Air Warfare Center Indianapolis, Indiana

IDEM (Indiana Department of Environmental Management), October 1995. Voluntary Remediation Program Resource Guide. Office of Environmental Response.

Tetra Tech NUS, Inc., August 7, 1998, Technical Memorandum of Phase II Remedial Investigation Analyses.

Tetra Tech NUS, Inc., September 1998, Proposed Plan for AOC 1 - Former Plating Area, Building 1000 - Naval Air Warfare Center Indianapolis, Indiana.

Tetra Tech NUS, Inc., November 1998, Phase I and II Remedial Investigation Report - Revision 2 - Naval Air Warfare Center Indianapolis, Indiana.

U.S. EPA (United States Environmental Protection Agency), 1989. Guidance on Preparing Superfund Decision Documents - Interim Final. EPA/540/G-89/007. Office of Emergency and Remedial Response, Washington, DC.

U.S. EPA (United States Environmental Protection Agency), 1990. National Contingency Plan. Federal Register Vol. 55 No. 46 pp. 8666-8865.

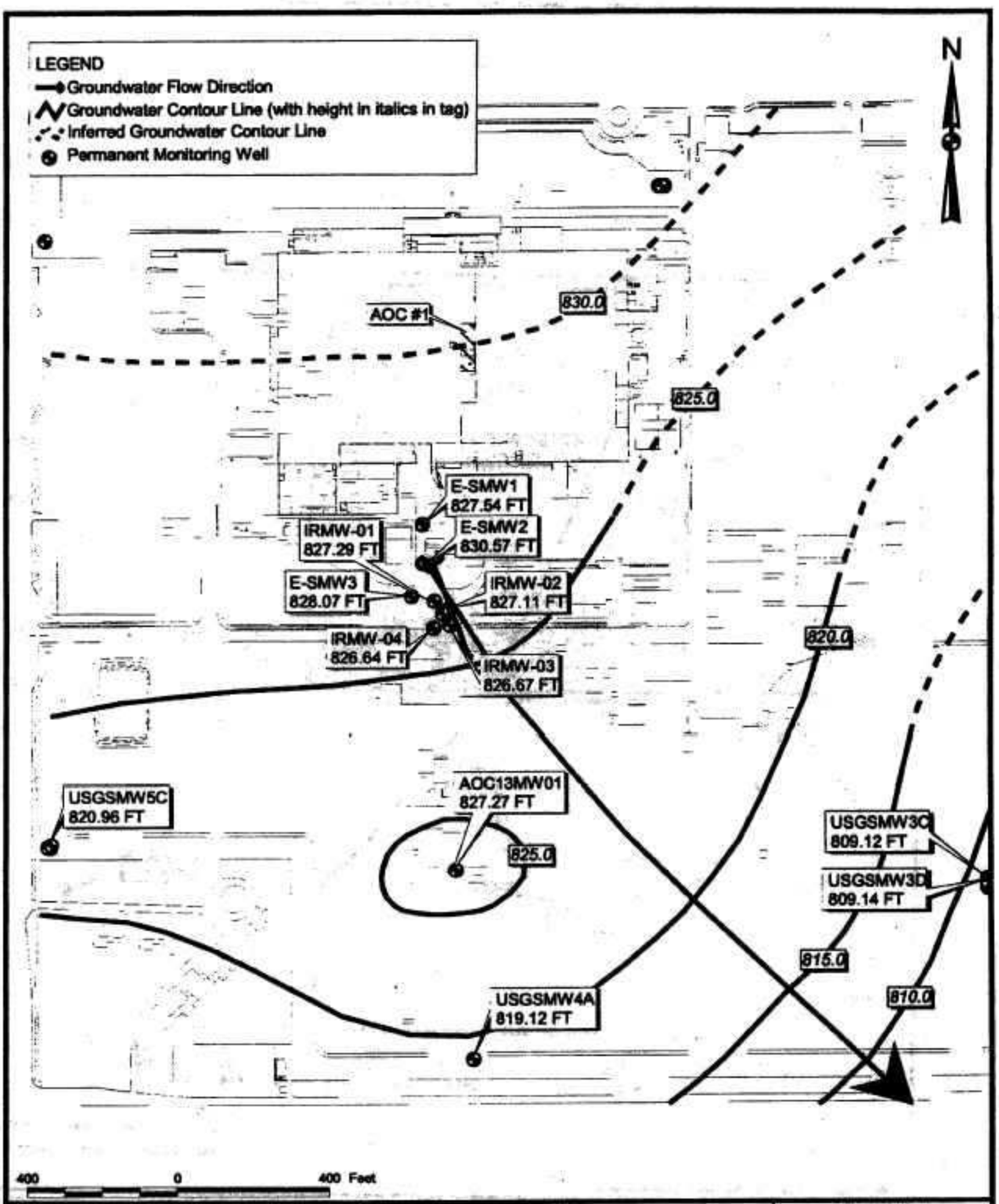
U.S. Geological Survey, 1997, Hydrogeology and Ground-Water Flow in the Vicinity of the Naval Air Warfare Center, Indianapolis, Indiana., Risch, M. R. and R. F. Duwelius, U.S. Department of the Interior, U.S. Geological Survey, Indianapolis, Indiana, Final Report.

U.S. Geological Survey, 1998, Hydrogeology, Ground-Water Quality, Ground Water flow at the Naval Air Warfare Center, Indianapolis, Indiana., Risch, M. R., U.S. Department of the Interior, U.S. Geological Survey, Indianapolis, Indiana, Draft Report.

AOC 1

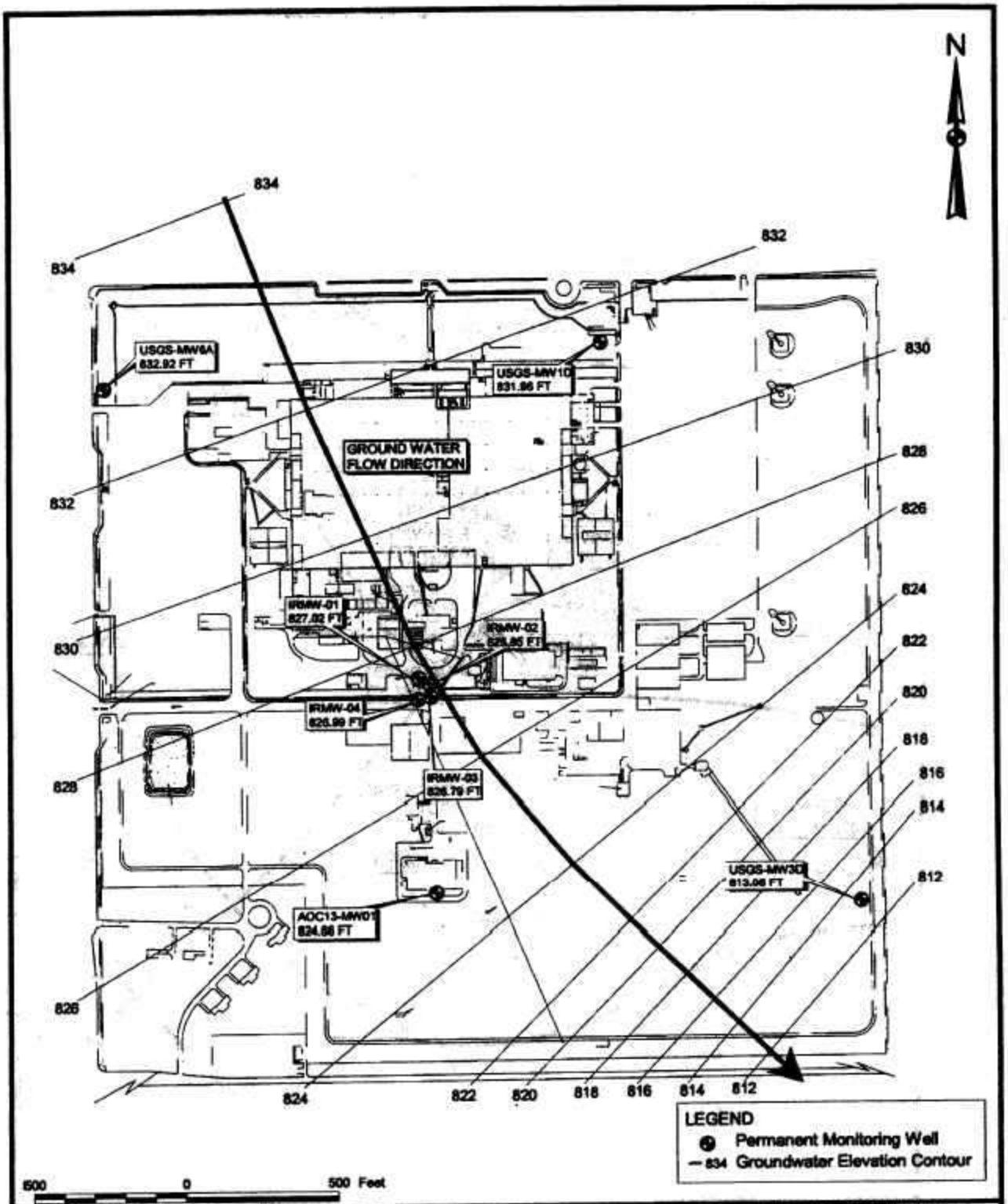
APPENDIX A

GROUNDWATER FLOW DIRECTION FIGURES



DRAWN BY: D. PERRY	DATE: 23-JUL-98	BASEWIDE POTENTIOMETRIC SURFACE CONTOUR MAP, SHALLOW AQUIFER, SEPT. 27, 1997 DECISION DOCUMENT NAVAL AIR WARFARE CENTER INDIANAPOLIS MARION COUNTY, INDIANA	CONTRACT NUMBER: —
CHECKED BY:	DATE:		APPROVED BY: — DATE: —
COST/SCHEDULE-AREA:			APPROVED BY: — DATE: —
SCALE: AS NOTED			DRAWING NO.: FIGURE A-1 REV: 0

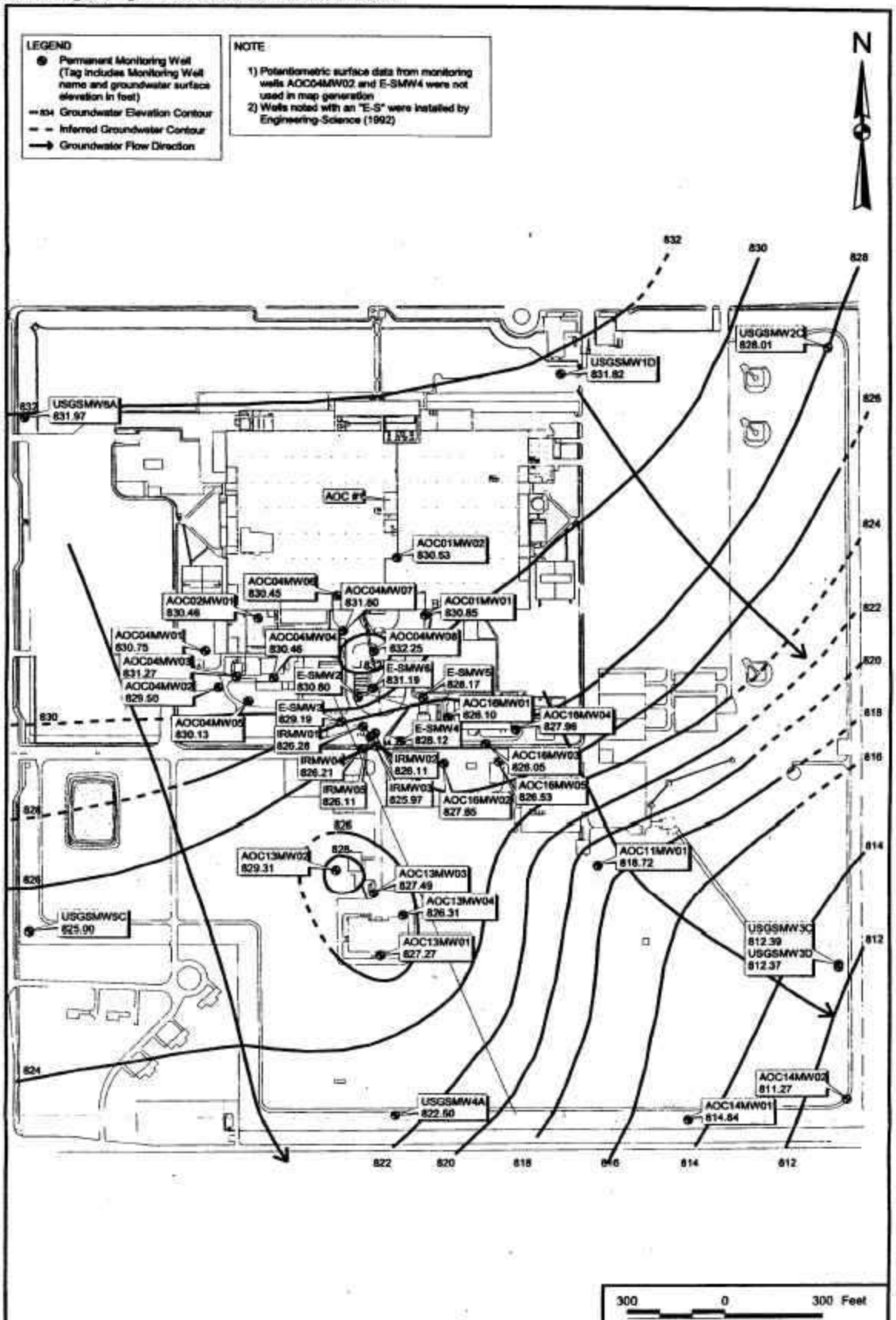
P:\GIS\71797173_PROPOSED_PLAN.APR 17-NOV-98 DNP NEW WELLS AV LAYOUT



DRAWN BY: D. PERRY	DATE: 17-NOV-98	BASEWIDE POTENTIOMETRIC SURFACE CONTOUR MAP, SHALLOW AQUIFER, DEC. 10, 1997 DECISION DOCUMENT NAVAL AIR WARFARE CENTER INDIANAPOLIS MARION COUNTY, INDIANA	CONTRACT NUMBER: —
CHECKED BY:	DATE:		APPROVED BY: — DATE: —
COST/SCHEDULE-AREA:			APPROVED BY: — DATE: —
SCALE: AS NOTED			DRAWING NO.: FIGURE A-2 REV: 0

P:\GIS\71737173_PROPOSED_PLAN.APR 17-NOV-98 DNP BASEWIDE POTENTIOMETRIC CONTOUR LAYOUT

P:\GIS\71737\173_PROPOSED_PLAN.APR 17-NOV-98 BNP SHALLOW AQUIFER ZONE LAYOUT



AOC 1

APPENDIX B

REMEDIAL INVESTIGATION REPORT LABORATORY DATA, RISK ASSESSMENT TABLES AND SAMPLE LOCATION FIGURE

TABLE 7-2A
SUMMARY OF POSITIVE DETECTIONS IN SURFACE SOILS
AOC 1 - THE FORMER PLATING AREA, BUILDING 1000
PHASE I REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER:	A01DP00101						BACKGROUND (1)
SAMPLE DATE:	11/18/96	/ /	/ /	/ /	/ /	/ /	
BORING:	AOC01DP01						
AOC:	A01						
DEPTH:	0 - 1	-	-	-	-	-	
FIELD DUPLICATE OF:							
SEMIVOLATILES (µg/kg)							
BIS(2-ETHYLHEXYL)PHTHALATE	61 J						1100
BUTYLBENZYL PHTHALATE	51 J*						ND
METALS (mg/kg)							
ALUMINUM	9120 J						22217
ARSENIC	10.4 J						21.3
BARIUM	113 J						222
BERYLLIUM	0.74						1.13
CALCIUM	53800 J						914377
CHROMIUM	20.3 J						27.1
COBALT	9.9 J						22.5
COPPER	21.3 J						30.3
IRON	19900 J						30170
LEAD	8.3 J						61.7
MAGNESIUM	25000 J						157362
MANGANESE	882 J						2130
MERCURY	0.05						0.194
POTASSIUM	1210 J						1832
VANADIUM	25.7 J						51.3
ZINC	59 J						113

(1) Background values presented for organics are the maximum detected results in the background soil data set.
Background values presented for inorganics are the 95% Upper Tolerance Limits (UTL) which are based on the background soil data set.
ND indicates that the parameter was analyzed but not detected.
*** - indicates the concentration displayed exceeds background.**
Blank space indicates sample not analyzed for that particular compound.

TABLE 7-2B
SUMMARY OF POSITIVE DETECTIONS IN SUBSURFACE SOILS
AOC 1 - THE FORMER PLATING AREA, BUILDING 1000
PHASE I REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER:	A01DP00102	A01DP00103					BACKGROUND (1)
SAMPLE DATE:	11/18/96	11/18/96	/ /	/ /	/ /	/ /	
BORING:	AOC01DP01	AOC01DP01					
AOC:	A01	A01					
DEPTH:	2 - 4	6 - 8	-	-	-	-	
FIELD DUPLICATE OF:							
VOLATILES (µg/kg)							
TRICHLOROETHENE	13 U	38 J*					10
METALS (mg/kg)							
ALUMINUM	21600 J	6670 J					22217
ARSENIC	8.9 J	5.7 J					21.3
BARIUM	175 J	33.4 J					222
BERYLLIUM	1.1	0.57					1.13
CALCIUM	3770 J	95800 J					914377
CHROMIUM	25.1 J	26.3 J					27.1
COBALT	19.9 J	4.8 J					22.5
COPPER	21.1 J	13.8 J					30.3
HEXAVALENT CHROMIUM	0.98 U	2.7 *					ND
IRON	28600 J	13300 J					30170
LEAD	17.1 J	12.3 J					61.7
MAGNESIUM	4000 J	31000 J					157362
MANGANESE	1270 J	365 J					2130
MERCURY	0.07	0.05					0.194
POTASSIUM	1000 J	1340 J					1832
VANADIUM	38.7 J	17.5 J					51.3
ZINC	71.7 J	42.3 J					113

(1) Background values presented for organics are the maximum detected results in the background soil data set.
Background values presented for inorganics are the 95% Upper Tolerance Limits (UTL) which are based on the background soil data set.
ND indicates that the parameter was analyzed but not detected.
*** - indicates the concentration displayed exceeds background.**
Blank space indicates sample not analyzed for that particular compound.

TABLE 7-2C
SUMMARY OF POSITIVE DETECTIONS IN GROUNDWATER
AOC 01 - THE FORMER PLATING AREA, BUILDING 1000
PHASE I REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER: AQUIFER: SAMPLE DATE: LOCATION: AOC: FIELD DUPLICATE OF:	A01DPG0101 Shallow 11/19/96 AOC01DP01 A01	/ /	/ /	/ /	/ /	/ /	Background (1)
VOLATILES (µg/L)							
1,1,1-TRICHLOROETHANE	1 J *						ND
1,1-DICHLOROETHANE	22 *						ND
1,1-DICHLOROETHENE	8 J *						ND
TOLUENE	4 J *						ND
TRICHLOROETHENE	55 *						ND
SEMIVOLATILES (µg/L)							
BIS(2-ETHYLHEXYL)PHTHALATE	4 J						82.5
METALS (µg/L)							
ALUMINUM	43200 J *						ND
ANTIMONY	5.2 J *						ND
ARSENIC	54.9 *						6.3
BARIUM	294 J						371
BERYLLIUM	2.5 *						ND
CALCIUM	476000 J *						198500
CHROMIUM	110 J *						ND
COBALT	41.5 J *						ND
COPPER	136 J *						ND
IRON	106000 J *						7530
LEAD	30.2 J *						1.1
MAGNESIUM	146000 J *						76500
MANGANESE	1730 J *						236
MERCURY	0.17						0.18
NICKEL	130 J *						ND
POTASSIUM	10600 J *						3600

(1) Background values presented for organics are the maximum detected results in the background groundwater data set.
Background values presented for inorganics are the 95% Upper Tolerance Limits (UTL) which are based on the background groundwater data set.
ND indicates that the parameter was analyzed but not detected.
*** - indicates the concentration displayed exceeds background.**
Blank space indicates sample not analyzed for that particular compound.

TABLE 7-2C
SUMMARY OF POSITIVE DETECTIONS IN GROUNDWATER
AOC 01 - THE FORMER PLATING AREA, BUILDING 1000
PHASE I REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER: AQUIFER: SAMPLE DATE: LOCATION: AOC: FIELD DUPLICATE OF:	A01DPG0101 Shallow 11/19/96 AOC01DP01 A01	/ /	/ /	/ /	/ /	/ /	Background (1)
METALS (µg/L)							
SODIUM	39100 J						274000
VANADIUM	97.7 J *						ND
ZINC	447 J *						ND

(1) Background values presented for organics are the maximum detected results in the background groundwater data set.
Background values presented for inorganics are the 95% Upper Tolerance Limits (UTL) which are based on the background groundwater data set.
ND indicates that the parameter was analyzed but not detected.
*** - indicates the concentration displayed exceeds background.**
Blank space indicates sample not analyzed for that particular compound.

FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR SOILS
AOC 01 - THE FORMER PLATING AREA, BUILDING 1000
PHASE II REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER: SAMPLE DATE: BORING: AOC: DEPTH: FIELD DUPLICATE OF:	A01DP00302 04/26/98 AOC01DP03 A01 2 - 4	A01DP00303 04/26/98 AOC01DP03 A01 6 - 8	A01DP00304 04/26/98 AOC01DP03 A01 10 - 12	/ / -	/ / -	/ / -	/ / -
VOLATILES (µg/kg)							
1,1,1-TRICHLOROETHANE	12 U	13 U	11 U				
1,1,2,2-TETRACHLOROETHANE	12 U	13 U	11 U				
1,1,2-TRICHLOROETHANE	12 U	13 U	11 U				
1,1-DICHLOROETHANE	12 U	13 U	11 U				
1,1-DICHLOROETHENE	12 U	13 U	11 U				
1,2-DICHLOROETHANE	12 U	13 U	11 U				
1,2-DICHLOROETHENE (TOTAL)	12 U	13 U	11 U				
1,2-DICHLOROPROPANE	12 U	13 U	11 U				
2-BUTANONE	12 U	13 U	11 U				
2-HEXANONE	12 U	13 U	11 U				
4-METHYL-2-PENTANONE	12 U	13 U	11 U				
ACETONE	12 U	99 J	11 U				
BENZENE	12 U	13 U	11 U				
BROMODICHLOROMETHANE	12 U	13 U	11 U				
BROMOFORM	12 U	13 U	11 U				
BROMOMETHANE	12 U	13 U	11 U				
CARBON DISULFIDE	12 U	13 U	11 U				
CARBON TETRACHLORIDE	12 U	13 U	11 U				
CHLOROBENZENE	12 U	13 U	11 U				
CHLOROETHANE	12 U	13 U	11 U				
CHLOROFORM	12 U	13 U	11 UJ				
CHLOROMETHANE	12 U	13 U	11 U				
CIS-1,3-DICHLOROPROPENE	12 U	13 U	11 U				
DIBROMOCHLOROMETHANE	12 U	13 U	11 U				
ETHYLBENZENE	12 U	13 U	11 U				
METHYLENE CHLORIDE	12 U	13 U	11 U				
STYRENE	12 U	13 U	11 U				
TETRACHLOROETHENE	12 U	13 U	11 U				

FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR SOILS
AOC 01 - THE FORMER PLATING AREA, BUILDING 1000
PHASE II REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER: SAMPLE DATE: BORING: AOC: DEPTH: FIELD DUPLICATE OF:	A01DP00302 04/26/98 AOC01DP03 A01 2 - 4	A01DP00303 04/26/98 AOC01DP03 A01 6 - 8	A01DP00304 04/26/98 AOC01DP03 A01 10 - 12	/ / -	/ / -	/ / -	/ / -
VOLATILES (µg/kg)							
TOLUENE	12 U	13 U	11 U				
TRANS-1,3-DICHLOROPROPENE	12 U	13 U	11 U				
TRICHLOROETHENE	12 U	13 U	11 U				
VINYL CHLORIDE	12 U	13 U	11 U				
XYLENES, TOTAL	12 U	13 U	11 U				
METALS (mg/kg)							
ALUMINUM	13400 J	16000 J	5880 J				
ANTIMONY	0.49 UR	0.51 UR	0.43 UR				
ARSENIC	4.7	9.4 J	4.8 J				
BARIUM	97.5 J	199 J	42.9 J				
BERYLLIUM	0.53 U	0.99 U	0.47 U				
CADMIUM	0.06 U	0.25 U	0.05 U				
CALCIUM	2280 J	3950 J	96700 J				
CHROMIUM	16.7 J	24.1 J	11.9 J				
COBALT	6.9	13.3	5.9				
COPPER	13.9 J	23.7 J	16.7 J				
IRON	17800 J	25900 J	13700 J				
LEAD	12.2 J	18.9 J	7.8 J				
MAGNESIUM	2430 J	3570 J	33400 J				
MANGANESE	104 J	1170 J	313 J				
MERCURY	0.05 U	0.05 U	0.05 U				
NICKEL	12.2	54.3	18.6				
POTASSIUM	600	940	1250				
SELENIUM	0.77 U	0.8 U	0.68 U				
SILVER	2.7 U	3.6 U	0.83 U				
SODIUM	141 U	185 U	202 U				
THALLIUM	0.37 U	0.38 UJ	0.32 UJ				
TIN	6.1 UJ	6.3 UJ	5.3 UJ				

FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR SOILS
AOC 01 - THE FORMER PLATING AREA, BUILDING 1000
PHASE II REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER:	A01DP00302	A01DP00303	A01DP00304	/ /	/ /	/ /	/ /
SAMPLE DATE:	04/26/98	04/26/98	04/26/98				
BORING:	AOC01DP03	AOC01DP03	AOC01DP03				
AOC:	A01	A01	A01				
DEPTH:	2 - 4	6 - 8	10 - 12	-	-	-	-
FIELD DUPLICATE OF:							
METALS (mg/kg)							
VANADIUM	30	35.6	18.1				
ZINC	53.2 J	89.6 J	53.7 J				

FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR GROUNDWATER
AOC 01 - THE FORMER PLATING AREA, BUILDING 1000
PHASE II REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER: AQUIFER: SAMPLE DATE: LOCATION: AOC: FIELD DUPLICATE OF:	A01MW00103 Shallow 05/19/98 AOC01MW01 A01	A01MW00203 Shallow 05/07/98 AOC01MW02 A01	/ /	/ /	/ /	/ /	/ /
VOLATILES (µg/kg)							
1,1,1-TRICHLOROETHANE	1 U	1 U					
1,1,2,2-TETRACHLOROETHANE	1 U	1 U					
1,1,2-TRICHLOROETHANE	1 U	1 U					
1,1-DICHLOROETHANE	1 U	1 U					
1,1-DICHLOROETHENE	1 U	1 U					
1,2-DIBROMO-3-CHLOROPROPANE	1 U	1 U					
1,2-DIBROMOETHANE	1 U	1 U					
1,2-DICHLOROETHANE	1 U	1 U					
1,2-DICHLOROPROPANE	1 U	1 U					
2-BUTANONE	5 UR	5 UR					
2-HEXANONE	5 U	5 U					
4-METHYL-2-PENTANONE	5 U	5 U					
ACETONE	5 UR	5 UR					
BENZENE	1 U	1 U					
BROMOCHLOROMETHANE	1 U	1 U					
BROMODICHLOROMETHANE	1 U	1 U					
BROMOFORM	1 U	1 U					
BROMOMETHANE	1 U	1 U					
CARBON DISULFIDE	1 U	1 U					
CARBON TETRACHLORIDE	1 U	1 U					
CHLOROBENZENE	1 U	1 U					
CHLOROETHANE	1 U	1 U					
CHLOROFORM	1 U	1 U					
CHLOROMETHANE	1 U	1 U					

FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR GROUNDWATER
AOC 01 - THE FORMER PLATING AREA, BUILDING 1000
PHASE II REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER: AQUIFER: SAMPLE DATE: LOCATION: AOC: FIELD DUPLICATE OF:	A01MW00103 Shallow 05/19/98 AOC01MW01 A01	A01MW00203 Shallow 05/07/98 AOC01MW02 A01	/ /	/ /	/ /	/ /	/ /
VOLATILES (µg/L)							
CIS-1,2-DICHLOROETHENE	1 U	1 U					
CIS-1,3-DICHLOROPROPENE	1 U	1 U					
DIBROMOCHLOROMETHANE	1 U	1 U					
ETHYLBENZENE	1 U	1 U					
METHYLENE CHLORIDE	2 U	2 U					
STYRENE	1 U	1 U					
TETRACHLOROETHENE	1 U	1 U					
TOLUENE	1 U	1 U					
TRANS-1,2-DICHLOROETHENE	1 U	1 U					
TRANS-1,3-DICHLOROPROPENE	1 U	1 U					
TRICHLOROETHENE	1 U	1 U					
VINYL CHLORIDE	1 U	1 U					
XYLENES, TOTAL	1 U	1 U					
SEMIVOLATILES (µg/L)							
1,2,4-TRICHLOROBENZENE	1 U	1 U					
1,2-DICHLOROBENZENE	1 U	1 U					
1,3-DICHLOROBENZENE	1 U	1 U					
1,4-DICHLOROBENZENE	1 U	1 U					
METALS (µg/L)							
ALUMINUM	36.7 U	354 U					
ANTIMONY	2.3 U	2.3 U					
ARSENIC	2.3 U	2.3 U					
BARIUM	114	141 J					
BERYLLIUM	0.61 U	0.88 U					

FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR GROUNDWATER
AOC 01 - THE FORMER PLATING AREA, BUILDING 1000
PHASE II REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER:	A01MW00103	A01MW00203					
AQUIFER:	Shallow	Shallow					
SAMPLE DATE:	05/19/98	05/07/98	/ /	/ /	/ /	/ /	/ /
LOCATION:	AOC01MW01	AOC01MW02					
AOC:	A01	A01					
FIELD DUPUCATE OF:							
METALS (µg/L)							
CADMIUM	0.27 U	0.27 U					
CALCIUM	156000 J	140000 J					
CHROMIUM	6.6 U	6.6 U					
COBALT	5.7 U	5.7 U					
COPPER	5.5 U	5.5 U					
IRON	7.2 U	1050 J					
LEAD	1.7 U	1.7 U					
MAGNESIUM	40900 J	45400 J					
MANGANESE	1.4 J	219 J					
MERCURY	0.13 U	0.13 U					
NICKEL	6.8 U	6.8 U					
POTASSIUM	1590	2210 J					
SELENIUM	3.6 U	3.6 U					
SILVER	2.8 U	4.5 U					
SODIUM	72700 J	39600 J					
THALLIUM	3.1 U	1.7 U					
TIN	28.4 U	28.3 U					
VANADIUM	5.8 U	5.8 U					
ZINC	10.8 U	8.4 U					

Data validation was conducted in accordance with the EPA National Functional Guidelines for Organic and Inorganic Data Review and EPA Region V guidelines. The following data qualifiers were used during the data review process:

- U - Indicates that the analyte was not detected at the numerical detection limit. Nondetected results reported by the laboratory and positive results qualified due to laboratory or field blank contamination (false positives) are reported using this qualifier.

- BU - Indicates that the analyte was detected in the associated method blank but the result is considered to be a false positive as a result of method blank contamination.

- BJ – Indicates that the analyte was detected in the associated laboratory method blank. The stated result is qualified as estimated since the concentration exceeds the validation blank action level.

- UJ - Indicates that the analyte was not detected. However, the detection limit is estimated as a result of a noncompliance encountered during laboratory analysis. The associated detection limit is regarded as imprecise.

- J - Indicates that the analyte was detected and the associated numerical result is estimated or imprecise.

- UR - Indicates that the laboratory did not detect the analyte. However, the nondetected analyte is considered unreliable and unusable as a result of a gross technical deficiency.

- R - Indicates that the laboratory detected the analyte. However, the positive result is considered unreliable and unusable as a result of a gross technical deficiency.

The above qualifications are generally categorized as major and minor problems or deficiencies. Major problems are defined as those, which result in the rejection of a data. Such results are qualified either as R or UR. Minor problems are defined as those, which result in the estimation of a given data point. The following qualifiers identify data qualified as a consequence of minor problems: BU, BJ, UJ, and J.

TABLE 2-1

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
DIRECT CONTACT EXPOSURE - RESIDENTIAL LAND USE SCENARIO
AOC 1 - THE FORMER PLATING AREA, BUILDING 1000 - SURFACE SOIL
PHASE I & II REMEDIAL INVESTIGATIONS
NAVAL AIR WARFARE CENTER INDIANAPOLIS, INDIANA

Chemical	Frequency of Detection (1)	Range of Detection	Average Concentration Positive Hits	Location of Maximum	EPA Region III Risk-Based Concentrations Residential (2,3)	EPA Region IX Preliminary Risk-Based Goals Residential (3,4)	Indiana Tier II Cleanup Goals Residential (5)	Soil Screening Level Soil to Air (6)	Upper Tolerance Limit for Background (7)	Selected as a COPC? Residential Yes or No	Rationale for Contaminant Deletion or Selection (8)
Semivolatile Organic Compounds (ug/kg)											
Bis(2-Ethylhexyl)phthalate	1/1	61	61	AOC01DP01	46000	32000	45710	210000	---	No	BSL
Butylbenzyl phthalate	1/1	51	51	AOC01DP01	1600000	930000	10000000	530000	---	No	BSL
Metals (mg/kg)											
Aluminum	1/1	9120	9120	AOC01DP01	7800	7500	---	---	22217	No	BGK
Arsenic	1/1	10.4	10.4	AOC01DP01	0.43	0.38	81	380	21.3	No	BGK
Barium	1/1	113	113	AOC01DP01	550	520	10000	350000	222	No	BSL, BGK
Beryllium	1/1	0.74	0.74	AOC01DP01	16	0.14	0.5	690	1.13	No	BGK
Calcium	1/1	53800	53800	AOC01DP01	---	---	---	---	914377	No	NUT, BGK
Chromium (Total)	1/1	20.3	20.3	AOC01DP01	7800	210	---	---	27.1	No	BSL, BGK
Cobalt	1/1	9.9	9.9	AOC01DP01	470	330	---	---	22.5	No	BSL, BGK
Copper	1/1	21.3	21.3	AOC01DP01	310	280	---	---	30.3	No	BSL, BGK
Iron	1/1	19900	19900	AOC01DP01	2300	2200	---	---	30170	No	BGK
Lead	1/1	8.3	8.3	AOC01DP01	---	400	---	---	61.7	No	BSL, BGK
Magnesium	1/1	25000	25000	AOC01DP01	---	---	---	---	157362	No	NUT, BGK
Manganese	1/1	882	882	AOC01DP01	160	310	---	---	2130	No	BGK
Mercury	1/1	0.05	0.05	AOC01DP01	---	---	16.2	7	0.194	No	BSL, BGK
Potassium	1/1	1210	1210	AOC01DP01	---	---	---	---	1832	No	NUT, BGK
Vanadium	1/1	25.7	25.7	AOC01DP01	55	52	1890	---	51.3	No	BSL, BGK
Zinc	1/1	59	59	AOC01DP01	2300	2200	10000	---	113	No	BSL, BGK

Notes:

(1) - Data from the following sampling locations were included in the screening process: A01DP00101.
(2) - U.S. EPA Region III Risk Based Concentration Table, April 15, 1998.
(3) - Screening criteria corresponds to either a target hazard quotient of 0.1 for noncarcinogenic compounds or a target cancer risk of 1E-6 for carcinogenic compounds.
(4) - U.S. EPA Region IX Preliminary Remedial Goals, May 1, 1998.
(5) - IDEM Voluntary Remediation Program Resource Guide, October 1995.
(6) - U.S. EPA Soil Screening Guidance: Technical Background Document, May 1996.
(7) - Values from Phase I Remedial Investigation Report, November 1997.
(8) - Rationale Codes
Above Screening Levels (ASL)
Background Levels (BKG)
Essential Nutrient (NUT)
Below Screening Level (BSL)

ND - Not Detected.
COPCs - Chemicals of Potential Concern.

TABLE 2-2

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
DIRECT CONTACT EXPOSURE - NON RESIDENTIAL LAND USE SCENARIO
AOC 1 - THE FORMER PLATING AREA, BUILDING 1000 - SURFACE SOIL
PHASE I & II REMEDIAL INVESTIGATIONS
NAVAL AIR WARFARE CENTER INDIANAPOLIS, INDIANA

Chemical	Frequency of Detection (1)	Range of Detection	Average Concentration Positive Hits	Location of Maximum	EPA Region III Risk-Based Concentrations Non Residential (2,3)	EPA Region IX Preliminary Risk-Based Goals Non Residential (3,4)	Indiana Tier II Cleanup Goals Non Residential (5)	Soil Screening Level Soil to Air (6)	Upper Tolerance Limit for Background (7)	Selected as a COPC? Industrial Yes or No	Rationale for Contaminant Deletion or Selection (8)
Semivolatile Organic Compounds (ug/kg)											
Bis(2-Ethylhexyl)phthalate	1/1	61	61	AOC01DP01	410000	210000	4142860	210000	---	No	BSL
Butylbenzyl phthalate	1/1	51	51	AOC01DP01	41000000	930000	10000000	530000	---	No	BSL
Metals (mg/kg)											
Aluminum	1/1	9120	9120	AOC01DP01	200000	10000	---	---	22217	No	BSL, BGK
Arsenic	1/1	10.4	10.4	AOC01DP01	3.8	3	612	380	21.3	No	BGK
Barium	1/1	113	113	AOC01DP01	14000	10000	10000	350000	222	No	BSL, BGK
Beryllium	1/1	0 74	0 74	AOC01DP01	410	1.2	13 49	690	1.13	No	BSL, BGK
Calcium	1/1	53800	53800	AOC01DP01	---	---	---	---	914377	No	NUT, BGK
Chromium (Total)	1/1	20.3	20.3	AOC01DP01	1000	450	---	---	27.1	No	BSL, BGK
Cobalt	1/1	9.9	9.9	AOC01DP01	12000	2900	---	---	22.5	No	BSL, BGK
Copper	1/1	21.3	21.3	AOC01DP01	8200	7000	---	---	30.3	No	BSL, BGK
Iron	1/1	19900	19900	AOC01DP01	61000	10000	---	---	30170	No	NUT, BGK
Lead	1/1	8.3	8.3	AOC01DP01	---	1000	---	---	61.7	No	BSL, BGK
Magnesium	1/1	25000	25000	AOC01DP01	---	---	---	---	157362	No	NUT, BGK
Manganese	1/1	882	882	AOC01DP01	4100	4500	---	---	2130	No	BSL, BGK
Mercury	1/1	0.05	0.05	AOC01DP01	---	---	122.4	7	0 194	No	BSL, BGK
Potassium	1/1	1210	1210	AOC01DP01	---	---	---	---	1832	No	NUT, BGK
Vanadium	1/1	25.7	25.7	AOC01DP01	1400	1300	10000	---	51.3	No	BSL, BGK
Zinc	1/1	59	59	AOC01DP01	61000	10000	10000	---	113	No	BSL, BGK

Notes:
(1) - Data from the following sampling locations were included in the screening process: A01DP00101.
(2) - U.S. EPA Region III Risk Based Concentration Table, April 15, 1998.
(3) - Screening criteria corresponds to either a target hazard quotient of 0.1 for noncarcinogenic compounds or a target cancer risk of 1E-6 for carcinogenic compounds.
(4) - U.S. EPA Region IX Preliminary Remedial Goals, May 1, 1998.
(5) - IDEM Voluntary Remediation Program Resource Guide, October 1995.
(6) - U.S. EPA Soil Screening Guidance: Technical Background Document, May 1996
(7) - Values from Phase I Remedial Investigation Report, November 1997.
(8) - Rationale Codes Above Screening Levels (ASL)
Background Levels (BKG)
Essential Nutrient (NUT)
Below Screening Level (BSL)

ND - Not Detected.
COPCs - Chemicals of Potential Concern.

TABLE 2-3

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
DIRECT CONTACT EXPOSURE - RESIDENTIAL LAND USE SCENARIO
AOC 1 - FORMER PLATING AREA, BUILDING 1000 - SUBSURFACE SOIL
PHASE I & II REMEDIAL INVESTIGATIONS
NAVAL AIR WARFARE CENTER INDIANAPOLIS, INDIANA

Chemical	Frequency of Detection (1)	Range of Detection	Average Concentration Positive Hits	Location of Maximum	EPA Region III Risk-Based Concentrations Residential (2,3)	EPA Region IX Preliminary Risk-Based Goals Residential (3,4)	Indiana Tier II Cleanup Goals Residential (5)	Soil Screening Level Soil to Air (6)	Upper Tolerance Limit for Background (7)	Selected as a COPC? Residential Yes or No	Rationale for Contaminant Deletion or Selection (8)
Volatile Organic Compounds (ug/kg)											
Acetone	1/5	99	99	A01DP00303	780000	140000	1000000	16000	ND	No	BSL
Trichloroethene	1/5	38	38	A01DP00103	58000	2700	437110	3000	ND	No	BSL
Metals (mg/kg)											
Aluminum	5/5	5880 - 21600	12710	A01DP00102	7800	7500	---	---	22217	No	BGK
Arsenic	5/5	4.7 - 9.4	6.7	A01DP00303	0.43	0.38	438	380	21.3	No	BGK
Barium	5/5	33.4 - 199	109.56	A01DP00303	550	520	102200	350000	222	No	BSL, BGK
Beryllium	2/5	0.57 - 1.1	0.835	A01DP00102	16	0.14	118.6	690	1.13	No	BGK
Calcium	5/5	2280 - 96700	40500	A01DP00304	---	---	---	---	914377	No	NUT, BGK
Chromium (Total)	5/5	11.9 - 26.3	20.82	A01DP00103	7800	210	---	---	27.1	No	BSL, BGK
Hexavalent chromium	1/2	2.7	2.7	A01DP00103	39	30	7300	140	ND	No	BSL
Cobalt	5/5	4.8 - 19.9	10.16	A01DP00102	470	330	---	---	22.5	No	BSL, BGK
Copper	5/5	13.8 - 23.7	17.84	A01DP00303	310	280	---	---	30.3	No	BSL, BGK
Iron	5/5	13300 - 28600	19860	A01DP00102	2300	---	---	---	30170	No	BGK
Lead	5/5	7.8 - 18.9	13.66	A01DP00303	---	400	---	---	61.7	No	BSL, BGK
Magnesium	5/5	2430 - 33400	14880	A01DP00304	---	---	---	---	157362	No	NUT, BGK
Manganese	5/5	104 - 1270	644.4	A01DP00102	160	310	---	---	2130	No	BGK
Mercury	2/5	0.05 - 0.07	0.06	A01DP00102	---	---	87.6	7	0.194	No	BSL, BGK
Nickel	3/5	12.2 - 54.3	28.3667	A01DP00303	160	150	5400	130	108	No	BSL, BGK
Potassium	5/5	600 - 1340	1026	A01DP00103	---	---	---	---	1832	No	NUT, BGK
Silver	1/5	0.83	0.83	A01DP00304	39	37	1350	34	5.46	No	BSL, BGK
Sodium	1/5	202	202	A01DP00304	---	---	---	---	120	No	NUT
Vanadium	5/5	17.5 - 38.7	27.96	A01DP00102	55	52	10220	---	51.3	No	BSL, BGK
Zinc	5/5	42.3 - 89.6	62.1	A01DP00303	2300	2200	438000	---	113	No	BSL, BGK

Notes:
1 - Data from the following sampling locations were included in the screening process: A01DP00102, A01DP00103, A01DP00302, A01DP00303, A01DP00304
(2) - U.S. EPA Region III Risk Based Concentration Table, April 15, 1998.
(3) - Screening criteria corresponds to either a target hazard quotient of 0.1 for noncarcinogenic compounds or a target cancer risk of 1E-6 for carcinogenic compounds.
(4) - U.S. EPA Region IX Preliminary Remedial Goals, May 1, 1998.
(5) - IDEM Voluntary Remediation Program Resource Guide, October 1995.
(6) - U.S. EPA Soil Screening Guidance: Technical Background Document, May 1996.
(7) - Values from Phase I Remedial Investigation Report, November 1997.
(8) - Rationale Codes Above Screening Levels (ASL)
Background Levels (BKG)
Essential Nutrient (NUT)
Below Screening Level (BSL)
ND - Not Detected.
COPCs - Chemicals of Potential Concern.

TABLE 2-4

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
DIRECT CONTACT EXPOSURE - NON RESIDENTIAL LAND USE SCENARIO
AOC 1 - FORMER PLATING AREA, BUILDING 1000 - SUBSURFACE SOIL
PHASE I & II REMEDIAL INVESTIGATIONS
NAVAL AIR WARFARE CENTER INDIANAPOLIS, INDIANA

Chemical	Frequency of Detection (1)	Range of Detection	Average Concentration Positive Hits	Location of Maximum	EPA Region III Risk-Based Concentrations Non Residential (2,3)	EPA Region IX Preliminary Risk-Based Goals Non Residential (3,4)	Indiana Tier II Cleanup Goals Non Residential (5)	Soil Screening Level Soil to Air (6)	Upper Tolerance Limit for Background (7)	Selected as a COPC? Industrial Yes or No	Rationale for Contaminant Deletion or Selection (8)
Volatile Organic Compounds (ug/kg)											
Acetone	1/5	99	99	A01DP00303	20000000	610000	1000000	16000	ND	No	BSL
Trichloroethene	1/5	38	38	A01DP00103	520000	6100	437110	3000	ND	No	BSL
Metals (mg/kg)											
Aluminum	5/5	5880 - 21600	12710	A01DP00102	200000	10000	---	---	22217	No	BGK
Arsenic	5/5	4.7 - 9.4	6.7	A01DP00303	3.8	3	438	380	21.3	No	BGK
Barium	5/5	33.4 - 199	109.56	A01DP00303	14000	10000	102200	350000	222	No	BSL, BGK
Beryllium	2/5	0.57 - 1.1	0.835	A01DP00102	410	1.2	118 6	690	1.13	No	BSL, BGK
Calcium	5/5	2280 - 96700	40500	A01DP00304	---	---	---	---	914377	No	NUT, BGK
Chromium (Total)	5/5	11.9 - 26.3	20.82	A01DP00103	200000	450	---	---	27.1	No	BSL, BGK
Hexavalent chromium	1/2	2.7	2.7	A01DP00103	1000	64	7300	140	ND	No	BSL
Cobalt	5/5	4.8 - 19.9	10.16	A01DP00102	12000	2900	---	---	22.5	No	BSL, BGK
Copper	5/5	13.8 - 23.7	17.84	A01DP00303	8200	7000	---	---	30.3	No	BSL, BGK
Iron	5/5	13300 - 28600	19860	A01DP00102	61000	---	---	---	30170	No	NUT, BGK
Lead	5/5	7.8 - 18.9	13.66	A01DP00303	---	1000	---	---	61.7	No	BSL, BGK
Magnesium	5/5	2430 - 33400	14880	A01DP00304	---	---	---	---	157362	No	NUT, BGK
Manganese	5/5	104 - 1270	644.4	A01DP00102	4100	4500	---	---	2130	No	BSL, BGK
Mercury	2/5	0.05 - 0.07	0.06	A01DP00102	---	---	87.6	7	0.194	No	BSL, BGK
Nickel	3/5	12.2 - 54.3	28.3667	A01DP00303	4100	3700	29200	130	106	No	BSL, BGK
Potassium	5/5	600 - 1340	1026	A01DP00103	---	---	---	---	1832	No	NUT, BGK
Silver	1/5	0.83	0.83	A01DP00304	1000	940	7300	34	5.46	No	BSL, BGK
Sodium	1/5	202	202	A01DP00304	---	---	---	---	120	No	NUT, BGK
Vanadium	5/5	17.5 - 38.7	27.96	A01DP00102	1400	1300	10220	---	51.3	No	BSL, BGK
Zinc	5/5	42.3 - 89.6	62.1	A01DP00303	61000	10000	438000	---	113	No	BSL, BGK

Notes:
1 - Data from the following sampling locations were included in the screening process: A01DP00102, A01DP00103, A01DP00302, A01DP00303, A01DP00304
(2) - U.S. EPA Region III Risk Based Concentration Table, April 15, 1998.
(3) - Screening criteria corresponds to either a target hazard quotient of 0.1 for noncarcinogenic compounds or a target cancer risk of 1E-6 for carcinogenic compounds.
(4) - U.S. EPA Region IX Preliminary Remedial Goals, May 1, 1998.
(5) - IDEM Voluntary Remediation Program Resource Guide, October 1995
(6) - U.S. EPA Soil Screening Guidance: Technical Background Document, May 1996
(7) - Values from Phase I Remedial Investigation Report, November 1997.
(8) - Rationale Codes Above Screening Levels (ASL)
Background Levels (BKG)
Essential Nutrient (NUT)
Below Screening Level (BSL)
ND - Not Detected.
COPCs - Chemicals of Potential Concern.

TABLE 2-5

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
GROUNDWATER PROTECTION EVALUATION
AOC 1 - THE FORMER PLATING AREA, BUILDING 1000 - SURFACE AND SUBSURFACE SOIL
PHASE I & II REMEDIAL INVESTIGATIONS
NAVAL AIR WARFARE CENTER INDIANAPOLIS, INDIANA

Chemical	Maximum Concentration		Indiana Tier II Cleanup Goals		EPA Region IX Soil Screening Level	Selected as a COPC?	
	Surface Soil	Subsurface Soil	Non Residential	Residential	Soil to Groundwater	Industrial Yes or No	Residential Yes or No
Volatile Organic Compounds (ug/kg)							
Acetone	ND	99	136290	22793	16000	No	No
Trichloroethene	ND	38	25730	76	60	No	No
Semivolatile Organic Compounds (ug/kg)							
Bis(2-ethylhexyl)phthalate	61	ND	1406250	16427	3600000	No	No
Butylbenzyl Phthalate	51	ND	10000000	10000000	930000	No	No
Metals (mg/kg)							
Aluminum	9120	21600	---	---	---	NC	NC
Arsenic	40.4	9.4	---	---	29	No	No
Barium	113	199	---	---	1600	No	No
Beryllium	0.74	1.1	---	---	63	No	No
Calcium	83900	96700	---	---	---	NC	NC
Chromium	20.3	26.3	---	---	38	No	No
Hexavalent Chromium	ND	2.7	---	---	38	No	No
Cobalt	9.9	19.9	---	---	---	NC	NC
Copper	21.3	23.7	---	---	---	NC	NC
Iron	19900	28600	---	---	---	NC	NC
Lead	8.3	18.9	---	---	---	NC	NC
Magnesium	25000	33400	---	---	---	NC	NC
Manganese	662	1270	---	---	---	NC	NC
Mercury	0.05	0.07	---	---	---	NC	NC
Nickel	ND	54.3			130	No	No
Potassium	1210	1340	---	---	---	NC	NC
Silver	ND	0.83	---	---	34	No	No
Sodium	ND	202	---	---	---	NC	NC
Vanadium	25.7	38.7	---	---	6000	No	No
Zinc	59	89.6	---	---	12000	No	No

Notes:
ND - Not detected.
NC - No criteria is available.
Shaded bolded values indicate an exceedance of criteria.

TABLE 2-6

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
DIRECT CONTACT EXPOSURE - RESIDENTIAL LAND USE SCENARIO
AOC 1 - THE FORMER PLATING AREA, BUILDING 1000 - GROUNDWATER
PHASE I REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER INDIANAPOLIS, INDIANA

Chemical	Frequency of Detection (1)	Range of Detection	Average Concentration Positive Hits	Location of Maximum	EPA Region III RBC (2,3) Tap Water	Basis	EPA Region IX PRG (3,4) Tap Water	Basis	Indiana Tier II Cleanup Goals (5) Residential	Non Residential	EPA Drinking Water Standard MCL (6)	Upper Tolerance Limit for Background (7)	Selected as a COPC? Yes or No	Rationale for Deletion or Selection (8)
Volatile Organic Compounds (ug/L)														
1,1,1-Trichloroethane	1/1	1	1	A01DPG101	54	N	79	N	200	8198	200	ND	No	BSL
1,1-Dichloroethane	1/1	22	22	A01DPG101	60	N	81	N	640	10250	--	ND	No	BSL
1,1-Dichloroethene	1/1	8	8	A01DPG101	[redacted]	C	[redacted]	C	[redacted]	[redacted]	7	ND	Yes	ASL
Toluene	1/1	4	4	A01DPG101	75	N	72	N	1000	20440	1000	ND	No	BSL
Trichloroethene	1/1	55	55	A01DPG101	[redacted]	C	[redacted]	C	[redacted]	280	5	ND	Yes	ASL
Semivolatile Organic Compounds (ug/L)														
Bis(2-Ethylhexyl)phthalate	1/1	4	4	A01DPG101	4.8	C	4.8	C	6	204.9	6	ND	No	BSL
Metals (ug/L)														
Aluminum	1/1	43200	43200	A01DPG101	[redacted]	N	[redacted]	N	--	--	[redacted]	ND	Yes	ASL
Antimony	1/1	6.2	6.2	A01DPG101	[redacted]	N	[redacted]	N	6	80	6	ND	[redacted]	ASL
Arsenic	1/1	54.9	54.9	A01DPG101	0.045	C	[redacted]	C	[redacted]	[redacted]	[redacted]	[redacted]	Yes	ASL
Barium	1/1	294	294	A01DPG101	[redacted]	N	[redacted]	N	2000	7184	2000	371	No	BKG
Beryllium	1/1	2.5	2.5	A01DPG101	7.3	N	[redacted]	N	4	5	4	ND	Yes	ASL
Calcium	1/1	476000	476000	A01DPG101	--	--	--	--	--	--	--	186500	No	NUT
Chromium (Total)	1/1	110	110	A01DPG101	3700	N	--	N	--	--	[redacted]	ND	Yes	ASL
Cobalt	1/1	41.5	41.5	A01DPG101	220	N	220	N	--	--	--	16	No	BSL
Copper	1/1	136	136	A01DPG101	150	N	149	N	--	--	1300 (9)	ND	No	BSL
Iron	1/1	106000	106000	A01DPG101	[redacted]	N	[redacted]	N	--	--	[redacted]	7630	No	NUT
Lead	1/1	30.2	30.2	A01DPG101	--	--	[redacted]	--	--	--	[redacted]	[redacted]	Yes	ASL
Magnesium	1/1	146000	146000	A01DPG101	--	--	--	--	--	--	--	76300	No	NUT
Manganese	1/1	1730	1730	A01DPG101	[redacted]	N	[redacted]	N	--	--	[redacted]	236	Yes	ASL
Mercury	1/1	0.17	0.17	A01DPG101	--	N	--	N	2	61	2	0.18	No	BSL, BKG
Nickel	1/1	130	130	A01DPG101	[redacted]	N	[redacted]	N	[redacted]	2044	[redacted]	ND	Yes	ASL
Potassium	1/1	10800	10800	A01DPG101	--	--	--	--	--	--	--	3800	No	NUT
Sodium	1/1	39100	39100	A01DPG101	--	--	--	--	--	--	--	274000	No	NUT
Vanadium	1/1	97.7	97.7	A01DPG101	[redacted]	N	[redacted]	N	212.8	715.4	--	ND	Yes	ASL
Zinc	1/1	447	447	A01DPG101	1100	N	1108	N	9120	30690	5000	ND	No	BSL

Notes:
1 - Data from the following sampling locations were included in the screening process: A01DPG101.
(2) - U.S. EPA Region III Risk Based Concentration Table, April 15, 1998.
(3) - Screening criteria correspond to either a target hazard quotient of 0.1 for noncarcinogenic compounds or a target cancer risk of 1E-6 for carcinogenic compounds.
(4) - U.S. EPA Region IX Preliminary Remedial Goals, May 1, 1998.
(5) - IDEM Voluntary Remediation Program Resource Guide, October 1995.
(6) - U.S. EPA Drinking Water Regulations and Health Advisories, October 1996
(7) - Values from Phase I Remedial Investigation Report, November 1997.
(8) - Rationale Codes Above Screening Levels (ASL)
Background Levels (BKG)
Essential Nutrient (NUT)
Below Screening Level (BSL
(9) - Secondary MCL
RBC - Risk Based Concentration
PRG - Preliminary Remedial Goal
MCL - Maximum Contamination Level
N - Noncarcinogenic
C - Carcinogenic
Shaded values indicate an exceedance of criteria.

TABLE 2-7

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
AOC 1 - THE FORMER PLATING AREA, BUILDING 1000 - GROUNDWATER
PHASE II REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER INDIANAPOLIS, INDIANA

Chemical	Frequency of Detection (1)	Range of Detection	Average Concentration Positive Hits	Location of Maximum	EPA Region III RBC (2,3) Tap Water	Basis	EPA Region IX PRG (3,4) Tap Water	Basis	Indiana Tier II Cleanup Goals (5) Residential	Non Residential	EPA Drinking Water Standard MCL (6)	Upper Tolerance Limit for Background (7)	Selected as a COPC? (3) Yes or No	Rationale for Deletion or Selection (8)
Metals (ug/L)														
Sodium	1/1	141	141	A01MW00203	250	N	260	N	2000	7154	2000	371	No	BSL, BKG
Calcium	1/1	140000	140000	A01MW00203	--	--	--	--	--	--	--	196500	No	NUT, BKG
Iron	1/1	1560	1560	A01MW00203	1100	N	1100	N	--	--	[redacted]	7530	No	NUT, BKG
Magnesium	1/1	45400	45400	A01MW00203	--	--	--	--	--	--	--	79600	No	NUT, BKG
Manganese	1/1	239	239	A01MW00203	[redacted]	N	[redacted]	N	--	--	[redacted]	299	No	BKG
Potassium	1/1	2210	2210	A01MW00203	--	--	--	--	--	--	--	3660	No	NUT, BKG
Sodium	1/1	39800	39800	A01MW00203	--	--	--	--	--	--	--	274000	No	NUT, BKG

Notes:
(1) - Data from the following sampling locations were included in the screening process: A01MW00203.
(2) - U.S. EPA Region III Risk Based Concentration Table, April 15, 1998.
(3) - Screening criteria correspond to either a target hazard quotient of 0.1 for noncarcinogenic compounds or a target cancer risk of 1E-6 for carcinogenic compounds.
(4) - U.S. EPA Region IX Preliminary Remedial Goals, May 1, 1998.
(5) - IDEM Voluntary Remediation Program Resource Guide, October 1995.
(6) - U.S. EPA Drinking Water Regulations and Health Advisories, October 1996.
(7) - Values from Phase I Remedial Investigation Report, November 1997.
(8) - Rationale Codes Above Screening Levels (ASL)
Background Levels (BKG)
Essential Nutrient (NUT)
Below Screening Level (BSL)
(9) - Secondary MCL
RBC - Risk Based Concentration
PRG - Preliminary Remedial Goal
MCL - Maximum Contamination Level
N - Noncarcinogenic
C - Carcinogenic
Shaded values indicates an exceedance of criteria.

TABLE 7-8C

CHEMICALS OF CONCERN AND EXPOSURE CONCENTRATIONS
AOC 1 - FORMER PLATING AREA, BUILDING 1000
PHASE I REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

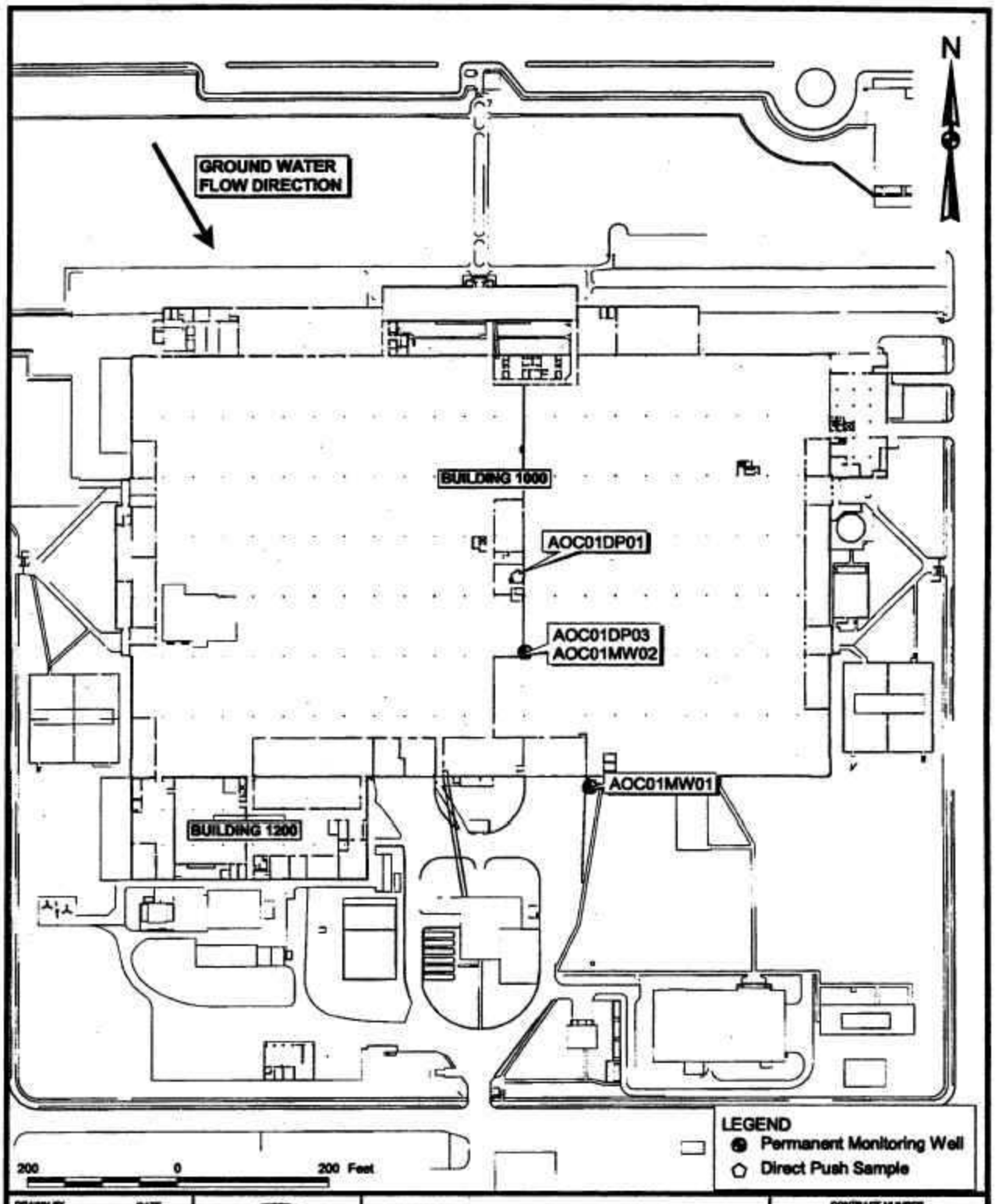
Chemical of Concern	Exposure Concentration	
	Groundwater [1] Concentration (mg/L)	Air Concentration Construction Worker (mg/m^3)
1,1,1-Trichloroethane	0.001	1.54E-06
1,1-Dichloroethane	0.022	1.63E-05
1,1-Dichloroethene	0.008	2.02E-05
Toluene	0.004	3.30E-06
Trichloroethene	0.055	5.83E-05
Bis(2-ethylhexyl)phthalate	0.004	4.82E-07

1 Exposure concentration for groundwater is the 95% UCL of the mean.

TABLE 7-8D

SUMMARY OF CANCER RISKS AND HAZARD INDICES
AOC 1 - FORMER PLATING AREA, BUILDING 1000
PHASE I REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY INDIANA

Receptor	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10^{-4}	Chemicals with Cancer Risks > 10^{-5}	Chemicals with Cancer Risks > 10^{-6}	Hazard Index	Chemicals with HI >1
Construction Worker Groundwater	Dermal Contact	1.9E-08	--	--	--	0.013	--
	Inhalation	1.3E-09	--	--	--	< 0.001	--
	Total	2.0E-08	--	--	--	0.013	--



DRAWN BY: D. PERRY	DATE: 10-SEP-98	AOC 1 RI SAMPLING LOCATIONS INDOOR PROCESS AREAS DECISION DOCUMENT NAVAL AIR WARFARE CENTER INDIANAPOLIS MARION COUNTY, INDIANA	CONTRACT NUMBER: —
CHECKED BY:	DATE:		APPROVED BY: — DATE: —
COST/SCHEDULE-AREA:			APPROVED BY: — DATE: —
SCALE: AS NOTED			DRAWING NO.: FIGURE B-1 REV: 0

P:\GIS\71737173_PROPOSED_PLAN.APR 17-NOV-98 DNP AOC 1 LOCATION LAYOUT

APPENDIX C

SITE SPECIFIC
INSTITUTIONAL CONTROL PLANS (ICPs)

AREA OF CONCERN (AOC) 1 IC PLAN

A. DESCRIPTION OF THE SITE:

AOC 1 consists of the Former Plating Area once centrally located within Building 1000 at the NAWC Indianapolis. The NAWC is located in Marion County, east of downtown Indianapolis and is bordered by East 21st Street to the north, Arlington Avenue to the west, East 16th Street to the south and Windsor Branch, a surface water tributary to the east.

B. IDENTIFICATION OF RESIDUAL RISK(S) PRESENTED:

Soil sampling conducted at AOC 1 revealed no Chemicals of Potential Concern (COPCs) above federal and state risk-based screening criteria. However, concentrations of several contaminants (including DCE, TCE, arsenic, beryllium, chromium and vanadium) were found in shallow groundwater beneath the site in excess of risk-based screening criteria. None of these contaminants were detected in groundwater samples taken down gradient of the site at concentrations exceeding such criteria. Based upon the data collected at this site, the residual risk presented is from exposure to contaminated groundwater and saturated soils beneath the site through the extraction of such water for human consumption or excavation of soils beneath Building 1000's foundation.

C. TYPES OF ICS IMPOSED:

The Navy intends on utilizing deed provisions to impose upon future transferees, their successors, assigns, lessees or licensees of the real property and facilities which encompass AOC 1, those restrictions necessary to ensure continued protection of human health and the environment. Those restrictions may be summarized as follows:

1. A prohibition against residential or residential-like uses of the property without prior authorization from the Navy (the reasonable anticipated future use at this site is industrial);

2. A prohibition against the extraction or usage of groundwaters from the shallow and middle aquifers underlying the NAWC property;

3. A requirement for the timely restoration of the concrete flooring in Building 1000 should any future owner or tenant of the building choose to remove any portion of such flooring. All removals, repairs, or partial demolition of such flooring will have to be performed in accordance with all applicable federal, state and local human health and safety and environmental requirements;

4. A requirement for annual compliance reporting by the future owner(s) of the NAWC property of the fact that only industrial uses of the property have been allowed and that no groundwater from other than the shallow and middle aquifer has been extracted or used without prior written authorization from the Navy.

D. PROPOSED DEED LANGUAGE IMPLEMENTING ICS:

The following land and groundwater use restriction provisions or their substantial equivalents will be incorporated into the quitclaim deed which shall effect the transfer of the property and facilities encompassing AOC 1 to any transferee:

1. The Grantee its successors, assigns, lessees, and licensees are prohibited from utilizing any portion of the real property and facilities encompassing AOC 1 as depicted in the attached survey for residential or residential type uses without the prior written authorization from the Navy. Such prohibited uses shall include, but not be limited to, nurseries, child or full time adult day care facilities or any playground area. Any additional site evaluation(s), risk assessment(s) and potential remedial measures as may be necessary if future usage of the property is for other than industrial purposes shall be without costs to the United States.

2. The Grantee its successors, assigns, lessees, and licensees are prohibited from utilizing any groundwater well and/or system that extracts, injects any substance into, or otherwise allows for impacts to, or use of, the ground waters lying beneath the NAWC or any portion thereof with the following limited exceptions: 1) installation is allowable with prior written authorization from the Navy where the wells / systems to be installed are open or screened only within bedrock, or totally within the thickness of the sand and gravel aquifer material directly adjacent to the soil/bedrock interface; 2) the installation, construction, and abandonment of such appurtenances shall comply with all applicable federal and state environmental laws and regulations including but not limited to Indiana Administrative Code 310 IAC, Section 16 and all applicable subsection therein.

3. The Grantee its successors, assigns, lessees, and licensees are prohibited from adversely affecting the integrity of all existing and any future groundwater monitoring or extraction wells to be installed by the Navy for as long as such wells are needed for environmental investigation or remedial purposes, as determined by the Navy in consultation with the EPA Region 5 and IDEM represenatives.

4. The Grantee its successors, assigns, lessees, and licensees are prohibited from adversely affecting through removal, repairs, partial demolition, or otherwise, the integrity of the concrete

flooring in Building 1000 as may presently serve as a cap over underlying soil contamination without first ensuring full compliance with all applicable federal, state and local human health and safety and environmental laws and regulations.

E. PARTY RESPONSIBLE FOR MONITORING THE INTEGRITY AND EFFECTIVENESS OF IMPOSED CONTROL(S):

The Navy intends on maintaining responsibility for overseeing the integrity and effectiveness of the IC remedy selected for AOC 1. The Navy plans on doing this by requiring annual IC compliance reporting by subsequent transferees of the property and facilities encompassing this site and by conducting all required CERCLA Five Year Reviews.

F. PROCEDURES FOR REPORTING AND ENFORCING AGAINST IC VIOLATIONS

Should the Navy learn that any subsequent owner, occupant or third party has violated or caused to be violated any IC associated with AOC 1, the Navy shall evaluate at that time whether it would be appropriate to exercise the response authorities granted to it under CERCLA Section 104 (42 USC 9604) the DERP (10 USC 2701 et. seq.) and Executive Order 12580, in order to ensure continued protectiveness of the site remedy implemented. The Navy will also evaluate the appropriateness of pursuing whatever rights it may have contractually or otherwise and/or for cost recovery under CERCLA Section 107 (42 USC 9607) against the violator of that IC(s). The Navy shall also promptly notify by letter the appropriate IDEM and U.S. EPA representatives upon learning of any IC violation(s) so that U.S. EPA can initiate whatever enforcement action U.S. EPA may believe to be appropriate at that time against such violator(s).

To ensure the opportunity for the Navy and U.S. EPA to be able to enforce the ICs associated with AOC 1, the Navy shall insert the following provisions or their substantial equivalent into the quitclaim deed which shall effect the transfer of the property encompassing AOC 1 to any third party:

1. The Navy reserves a right of access to all portions of the property for environmental investigation, remediation or other corrective actions. This reservation includes the right of access to and use of, to the extent permitted by law, available utilities at reasonable cost. These rights shall be exercisable in any case in which a remedial action, response action or corrective action is found to be necessary by the Navy after the date of conveyance of the property, or in which access is necessary to carry out a remedial action, response action or corrective action on adjoining property. Pursuant to this reservation, the Navy, the U.S. EPA and the State of Indiana, and their officers, agents, employees, contractors and subcontractors shall have the right (upon reasonable notice to the Grantee or the then owner and any authorized occupant of the property) to enter

upon the Property and conduct investigations and surveys, to include drillings, test-pitting, borings, data and record compilation, and other activities related to environmental investigation and to carry out remedial or removal actions as required or necessary under applicable authorities, including but not limited to monitoring wells, pumping wells, and treatment. Any such entry, including such activities, responses or remedial actions, shall be coordinated with the Grantee or its successors assigns, and tenants and shall be performed in a manner which minimizes interruption with Grantee's activities on the property.

2. The Grantee, its successors, assigns, lessees and licensees are prohibited from unreasonably interfering with any environmental investigation or remedial activities to be undertaken by the Navy on the property encompassing AOC 1 or surrounding NAWC property.

G. ASSURANCES REGARDING COMPLETION OF THE CERCLA FIVE-YEAR REVIEW PROCESS:

It is the Navy's intent to fully comply with the requirements of CERCLA as they may continue to apply to AOC 1 and to continue in part to oversee the long term effectiveness of the selected remedy through the timely undertaking and completion of CERCLA Five-Year Reviews.

H. IC RECORDATION / NOTICE REQUIREMENTS:

Those specific ICs reflected in this ICP and in the Proposed Plan (PP) and Decision Document (DD) for AOC 1 will be reflected in the quitclaim deed which shall be used to effect the transfer of the property encompassing AOC 1 and such deed will be recorded in the appropriate local property records office for the property by the transferee(s) of the real property upon which the site is situated. The transferee will be provided advance notice of those ICs and all pertinent site conditions by first being provided with a copy of this plan, the Environmental Baseline Survey (EBS) and requisite Finding of Suitability to Transfer (FOST) prepared by the Navy in connection with such transfer.

I. COMMITMENT TO PRE-TRANSFER MEETING:

To the extent appropriated funds may be available for such purposes, the Navy commits to meet at least five days before transfer with any and all prospective transferees of the real property and facilities encompassing AOC 1 in order to ensure that such transferee(s) fully understands the provisions of this plan.